



FRIDAY, JUNE 22, 1894.

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The office of the Railroad Gazette is now at 32 PARK PLACE, New York.

## Contributions.

## Von Borries System of Compounding.

HANOVER, May 30, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

On page 334 of your issue of May 11 I find a description of my new change-valve for compound locomotives, in which one valuable feature of this valve is not mentioned. When running single expansion, the pistons F and G take such a position (near to the dotted lines) that the force of the high pressure steam on the annular back area of piston F remains equal to the force of the steam at lower pressure in the receiver, on the front area of piston E. This position varies a little when running, in such a manner that the prolonged shaft of the piston F clears the hole in the intermediate plate N, just enough to introduce that quantity of steam from HG into the receiver at C, which is necessary to keep up the equilibrium of forces on the pistons.

By this working of the pistons, the pressure of steam in the receiver is kept in constant proportion to the pressure of the high pressure steam at H. This proportion being inverse to the areas of the pistons, can easily be regulated inversely to the proportion of the areas of the main pistons, so that both the latter get equal force and do equal work. Other change valves usually require a special reducing valve for this purpose.

VON BORRIES.

## Independent Exhaust for two Cylinder Compounds.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Gölsdorf system of compounding locomotives, as illustrated in your issue of June 1, is interesting as showing a simple starting gear, but it seems as a whole, another realization of the fact that devices which work well in Europe are not necessarily advantageous in this country, owing to the different conditions of service. The foreign roads, we understand, do not work their machinery up to its maximum capacity, but our roads do, and the difference in hauling power between the two cylinder compounds, incapable of working as a simple engine, and an equivalent simple engine has been shown on many roads to offset any fuel economy, since, as these engines must be loaded about two cars lighter than the simple engine, the question reduces itself to one of dollars and cents, dependent on the value of a car hauled over a division.

This question of power is such a radical one that I understand a Western road has found it absolutely necessary to supply a two-cylinder engine with an emergency exhaust in order to gain power on a maximum grade.

Another practical point ignored, is that these engines, in case of disabling on one side, as is not infrequent on large roads, must be hauled in, since without an emergency exhaust, it is impossible for them to run on one side like a simple engine.

These points are of such importance in our present engines that they are not overlooked by the Master Mechanics, when investigating the compound question, and cannot afford to be neglected by designers. Mr. Gölsdorf relies on a relief valve on the low pressure chest to keep the pressure from accumulating through the auxiliary port on a slow, hard start, while we, in this country, believe in a reducing valve before the steam gets to the chest, and thus avoid the uncertainty in the pressure of this wire-drawn steam, and occasional discomfort to the engineer of blowing a cloud of steam from the steam chest.

T. H. S.

## Master Car Builders' Convention.

We continue from page 425 our report of the Saratoga convention of the Master Car Builders' Association.

By an unfortunate typographical error the obituary committee on Mr. E. B. Wall was announced last week as being on Mr. E. Baldwin. The committee consists of M. N. Forney, F. D. Adams, J. M. Wallis and S. P. Bush.

On Wednesday morning President Grieves announced that the consideration of the Rules of Interchange would be in order at 10 o'clock; meantime the report on Wheel and Flange Gages would be considered. This report was read by the Secretary; an abstract follows. The report was received on motion of Mr. Casanave.

## WHEEL AND FLANGE GAGES.

The report on this subject, which has recently assumed such great importance, is made by a committee consisting of Messrs. Barr, Thomas Anderson and Thomas Fildes. The committee reprints in full the paper presented by Mr. Rhodes before the Western Railway Club in January of 1893, and printed in the *Railroad Gazette* February 3 of the same year, also the report of a committee representing the Maintenance of Way and Motive Power Departments of the Pennsylvania Railroad, which has never before been made public. These valuable papers are followed by the discussion and recommendation of the committee.

The report of the Pennsylvania Railroad Committee is

wheels have flanges of equal thickness and are mounted to a limit of 4 feet 6 3/4 inches from the back of one flange to the gage line of its mate, but to allow for present variations, and until the wheels actually in service have been adjusted to the stricter limit an interchange limit of 4 feet 7 inches is suggested. Then the committee had constructed a number of gages to the 4 feet 7 inch limit, and had a large number of wheels examined on the four grand divisions of the system. Thirteen thousand one hundred and forty-one pairs of wheels were measured under 3,461 cars. Of these only 13 per cent. were found to have their wheels properly mounted and proportioned to suit the requirements of equal and unequal throats. The committee recommends the adoption of a car inspector's gage made to the 4 feet 7 inch limit, to supersede the present interchange limits for maximum distances; as soon as sufficient progress has been made in remedying existing wheel defects this limit to be reduced 4 feet 6 3/4 inches; that the variation in flange thickness on the same axle shall not exceed 1/8 of an inch; that 1 1/2 inches be the maximum flange thickness.

The above are the recommendations of the Pennsylvania Railroad Committee. The M. C. B. Committee first lays down a set of definitions which we reprint in full as being something that has long been wanted:

1. Gage of Track—The shortest distance between heads of track rails, see fig. 20.

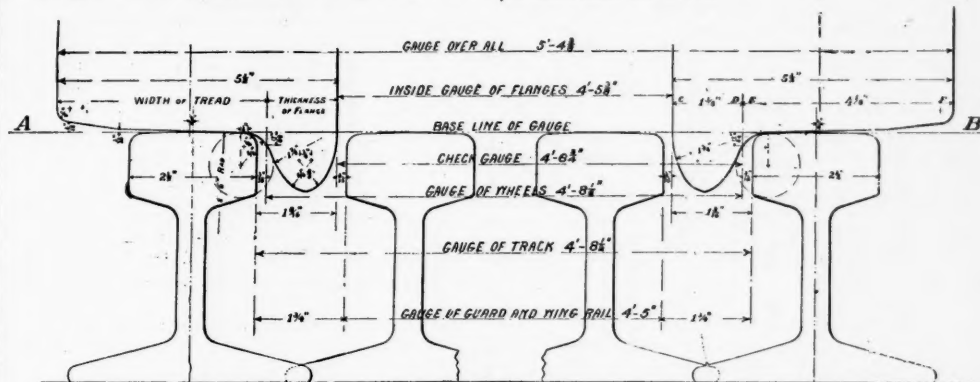


Fig. 20—Proposed Location of Gaging Points.

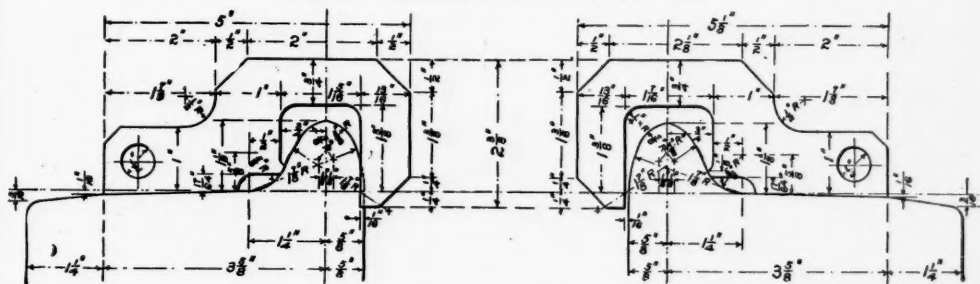


Fig. 21—Proposed Flange Limit Gages for New Wheels.

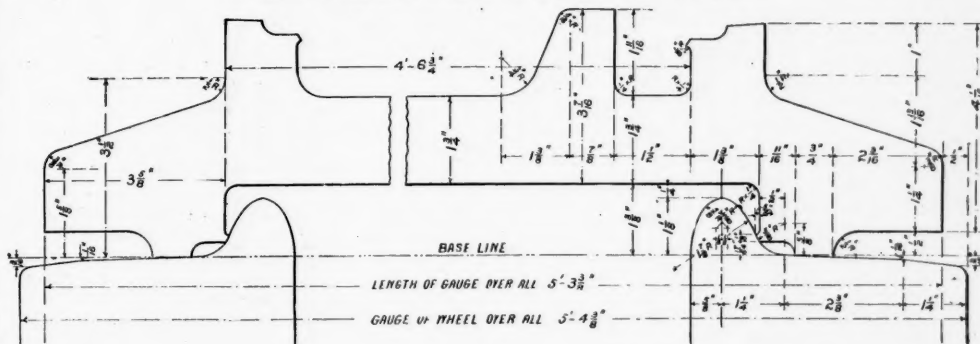


Fig. 22—Proposed Check Gage.

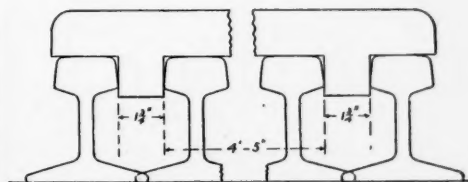


Fig. 23—Proposed Guard Rail Gage.

difficult to summarize, being very detailed and precise, and being accompanied by numerous engravings. That committee discovered that the wheel limits prescribed by the rules of interchange are defective in being applicable only to cases where both wheels of a mounted pair have flanges of equal thickness. New limits were finally chosen in order to make an accurate examination of the subject. It was the aim, in selecting these limits, to detect every possible combination of conditions that cause impingement on the frog point or blow on the guard rail and frog wing. These limits comprise an over-flange limit or wheel gage, designed to check the distance between those lines of any pair of wheels which run against the rail head; a limit measured from the back of a wheel with thin flange to the gage line of the other wheel of thicker flange; and a corresponding limit measured from the back of the wheel of thick flange to the gage line of the wheel of thin flange. These are considered the essential limits and are supplemented by a maximum flange limit and minimum over-all limit, measured from the gage line of each wheel to the outer edge of rim of the opposite wheel.

We shall not attempt to enumerate the cases of interference which the committee found by this careful method and which are tabulated in the report in an excellent way. The committee gradually got down to this,—that the ideal condition of immunity from impingement on the frog and blow on the guard rail is obtained when the

2. Track Rails—The two main rails forming the track.
3. Base Line for wheel gages for M. C. B. standard section; a line parallel to axis of wheel and drawn through point of intersection with tread, of a perpendicular line through center of throat curve (see fig. 20).
4. Inside Gage of Flanges—The distance between the two flanges of a pair of mounted wheels measured on a line parallel to the base line and 1/4 of an inch nearer the axis of the wheels (see fig. 20).
5. Gage of Wheels—The distance between the outside flanges of a pair of mounted wheels, measured on a line parallel to the base line, and 17-64 of an inch further from the axis of the wheels (see fig. 20).
6. Thickness of Flange—The distance measured on the base line from the point of measurement of the inside gage of flanges to the point of measurement of gage of wheels; see line c-d, fig. 20.
7. Width of Tread—The distance measured on the base line from the point of measurement of gage of wheels to outer edge of tread; see c-f, fig. 20.
8. Check Gage is the distance measured on the base

line from the point at which measurement of inside gage of flanges is taken on one wheel, to the point at which measurement of gage of wheels is taken on the mate wheel.

9. Over-all-Gage is the distance from outer edge of one wheel to outer edge of mate wheel.

Gage of Track . . . . . 4'-8 1/2" Width of Tread . . . . . 4 1/2"  
Inside Gage of Flanges . . . . . 4'-5 1/2" Check of Gage . . . . . 4'-6 3/4"  
Gage of Wheels . . . . . 4'-8 1/2" Over-all Gage . . . . . 5'-4 1/2"  
Thickness of Flange . . . . . 1 1/8"

Then the Committee recommends a pair of flange gages (fig. 21), such as Mr. Rhodes recommends for determining the maximum and minimum thickness of flange of new wheels; and a combination gage for mounting wheels and inspecting (fig. 22), which is essentially what the Pennsylvania Committee and Mr. Rhodes both recommend, but the dimensions are materially changed. The flange gages allow a variation of 1/16 of an inch above and below the standard thickness of flange, which is 1 1/8 inches. The gages are all laid out with reference to the base line and dimensions given in fig. 20, and according to the definitions adopted. It is considered of the utmost importance to adhere closely to the M. C. B. standard flange as a thicker flange is detrimental to the life of the wheels, rails and frogs. Finally the Committee recommends:

1st. That for mounting wheels the check gage (fig. 22) be used without delay.

2d. That all wheels should be purchased subject to the limits of the flange gages (fig. 21).

3d. That the old system of gaging wheels be continued for wheels cast prior to some future date, as established by the M. C. B. Association, and that for wheels cast after said date the check gage (fig. 22) be used. Your committee do not favor an interchange gage measuring 4'-7" instead of 4'-6 3/4", being of the opinion that doing this would render the future use of the 4'-6 3/4" gage impossible.

4th. That the present worn flange gage be continued.

5th. That the guard-rail gage, which was abandoned at M. C. B. Association meeting of 1893, be re-established as standard. This gage is shown in fig. 23.

6th. That the limits between flanges of 4'-5" and 4'-5 1/2" be reduced to come nearer to the standard of 4'-5 3/4".

Forty-three replies were received to the circular of inquiry. Of these replies all except five considered present gages satisfactory.

Mr. Marshall moved that the portion which refers to standards be recommended to the Committee and put in shape for action on adoption, the Committee to report the following day and the recommendation in regard to the Rules of Interchange to be taken up in connection with those rules when they are considered.

Mr. Rhodes seconded the motion and stated that a conference had been held the evening before and certain differences between the P. R. R. Committee report and his paper reconciled.

Mr. Marshall's motion was carried.

#### RULES OF INTERCHANGE.

The report of the Arbitration Committee and proposed amendments to the Rules were then taken up for consideration.

Mr. Barr moved the insertion after Section (i) of Rule 3 "Flanges over 1 1/8 inches thick; the same as the maximum gage shown by wheel gage committee, not to apply to wheels cast before Sept. 1, 1894."

Mr. Rhodes said that this is a very important point, that it will show the roads that are still using 4 ft. 9 in. track how they can conform to the wheel dimensions and flange dimensions without injuring their track. The M. C. B. standard flange is 1 1/8 and Mr. Barr's motion would give 1/16 of an inch margin, which does not interfere with the Association standards and is necessary in foundry practice.

Mr. Schroyer objected that this is not a matter to appear in the Rules of Interchange.

Mr. Barr thought that this should appear in the Rules and if he wants to receive thicker flanges he can instruct his men to do so.

Mr. Leeds thought that this should be properly in the inspector's hands and not in the Rules. On his road the gage is 4 ft. 9 in. If the 4 ft. 8 1/2 in. men want this limit, let them have it; the only objection is that it reduces the life of the wheel. The motion was put and carried.

An amendment to Rule 3, Section (r) that it be changed to read "out of gage, or wheels that measure less than 4 ft. 5 1/2 in., or more than 4 ft. 5 1/2 in. between flanges, or less than 5 ft. 4 in. over treads." Mr. Barr moved that action be deferred until after the report of the gage committee. Carried.

The next change suggested was the latter part of Section 9 "brake beams, levers and attachments not less than 2 1/2 in. from the top of the rail." Mr. Chamberlain moved to make it 1 1/2 in. On motion of Mr. Waitt this was tabled until Rule 8 is considered.

Paragraph 17 was made to read so as to include the cleaning and oiling of brake cylinders and triple valves within 12 months, and to require marking on them the date of cleaning and oiling. Paragraph 18 was superseded by this.

A new paragraph No. 24 was added, to include cars equipped with air signals and piped, but without brake apparatus. In such cases the hose and couplings are at the owner's risk unless the car is stenciled as being so equipped.

The Committee's recommendation regarding secure fastening of steps, ladders, etc., etc., being an amendment to Section (t), Rule 3 was adopted.

The Central Railway Club recommended under Section (u) of Rule 3 the addition of two figures, these figures to show the limit of cracks admissible in fillet of shank of coupler immediately back of the head, such limit to be 3/4 of an inch vertically or horizontally, or both; also a limit for length of crack in front wall or face of coupler, either at top or bottom. (See Figs. 8 and 9).

The Arbitration Committee considers that this might be a useful addition to the rule. The consideration of this involved a long discussion.

Mr. Wallis opposed the idea of passing defects in the coupler, back of the head.

Mr. Mackenzie found that the limit of 1/2 inch for such cracks is too small; they allowed couplers with cracks of 3/4 of an inch to run and they did so safely and did a great deal of work.

Mr. Casanave thought such defects most dangerous and that too much risk is taken in allowing them to exist; the great danger is of the coupler breaking and falling on the track.

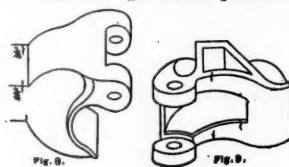
Mr. Rhodes sustained Mr. Casanave.

Mr. Waitt pointed out that in permitting cars to run with such defects the gentlemen are rendering themselves legally liable, so roads have refused positively to run a car with defective drawbars. They would not allow them to be carded and then run for the simple reason that they were rendered liable for the defects; he would prefer a limit which might be considered safe and thinks the limit set by the Committee is safe.

Mr. Potter understood that this defect is confined to one or two makes of bars and is a shrinkage crack and not broken in service, but Mr. Waitt disagreed with him in this and thought that such cracks came from service.

Mr. McKenzie thought they were not dangerous for couplers containing them had pulled up to 125,000 lbs. with no further fracture.

Mr. Barr suggested that the limit should be placed at one crack and asked the gentlemen present to watch the



thing closely and see whether they frequently find one or two cracks.

Mr. Wallis endorsed Mr. Barr, but Mr. Schroyer thought that the limit of 3/4 of an inch was all right and he would pass two cracks of that length.

Mr. Casanave endeavored to push the matter by getting in an amendment to show one crack back of the horn, on the same side with the guard arm, 3/4 of an inch long, but Mr. McKenzie and Mr. Schroyer opposed even this amendment.

Mr. Chamberlain thought that it was unwise to receive cars with any kind of a crack in the couplers; the coupler with one crack will give way and sooner or later fall.

Mr. Mitchell also appeared in the ranks of those who favored the liberal limit. On motion of Mr. West the recommendation of the Committee was adopted.

In Section (h), Rule 3, the words "these defects in knuckle are safe but should be carded off" were stricken out.

The Committee presented an addition to Rule 6 to the effect that any company finding a car with defect card attached may make such partial repairs as are necessary for the safe running of the car and strike the items repaired from the card and notify the company which issued the original card of these items, and the latter shall issue a defect card covering the partial repairs made.

Mr. Waitt moved that a time limit of twelve months instead of six be made in which to honor repairs to defective cars, which was lost.

Section (b), Rule 8, was altered to read "brake shoes worn out, no charge to be made for labor or credit for scrap." A number of minor changes were made and then Mr. Barr moved that a new section be added, Section (i), under Rule 8 to read "drawbars or couplers, drawbar timbers, drawbar springs and sills, cracked over transoms." Mr. Wade asked if one car being equipped with an automatic coupler and that coupler being broken on another line, they are to replace it and charge it to the owner of the car?

Mr. Barr answered yes, unless caused by derailments or wreck.

BRAKE SHOES IN M. C. B. SERVICE TESTS.

Kind of Shoe.	Manufacturer.	On Cast-Iron Wheels.	On Steel-Tired Wheels.	Total Shoes on Trial.
Hard cast iron . . . . .	Ramapo Wheel & Foundry Co. . . . .	32	16	48
Soft open hearth steel . . . . .	Solid Steel Co. . . . .	32	20	52
Hard open hearth steel . . . . .	Solid Steel Co. . . . .	32	20	52
Malleable iron . . . . .	Dayton Malleable Iron Co. . . . .	32	16	48
S. T. malleable iron . . . . .	Dayton Malleable Iron Co. . . . .	28	16	44
C. W. malleable iron . . . . .	Dayton Malleable Iron Co. . . . .	28	16	44
Congdon . . . . .	The Sargent Co. . . . .	28	20	48
Sargent special . . . . .	The Sargent Co. . . . .	28	16	44
Meehan . . . . .	The Sargent Co. . . . .	28	20	48
Lappin . . . . .	Lappin Brake Shoe Co. . . . .	28	20	48
Safety . . . . .	Safety Brake Shoe Co. . . . .	28	16	44
Soft steel . . . . .	Schoen Manufacturing Co. . . . .	28	20	48
Wrought iron . . . . .	Schoen Manufacturing Co. . . . .	28	20	48
Soft cast iron . . . . .	Pennsylvania R. R. Co. . . . .	Enough to wear out the others.		

Mr. Rhodes suggested that this matter should be well discussed before action; it is a radical change.

He suggested not attempting to pass this at the present Convention. This brought out a long and important discussion.

Mr. McKenzie moved to add center plates, and Mr. Schroyer to insert M. C. B. couplers, both of which were carried.

Mr. Waitt then moved to omit the item of drawbars entirely, which was carried. Then the amendment read "broken or defective draft timbers, or draft springs, or

center plates, or sills cracked over transoms, if damage is not caused by derailment or wreck." A vote was taken resulting in yeas 386, nays 465. The meeting then adjourned.

On Thursday morning the consideration of the Rules of Interchange was resumed. Section (k), of Rule 9, was made to read "one or more cracked brackets."

Mr. Mitchell moved to omit the entire last paragraph of Rule 9, reading "when axles are renewed the axles applied shall be stamped, etc., etc." This was carried.

Mr. West called attention to Section (c), under "axles," Rule 9, reading "axles less than the prescribed limit," but he said there is no limit for axles under 30,000 lbs. capacity of cars.

Mr. Grieves moved to return and take up the question of cars of 30,000 lbs. and under as to wheel seat and center, which was carried and then Mr. West moved that axles of 30,000 lbs. or less be not less than 4 1/4 at wheel seat, centers, 3 1/4. After considerable discussion the motion was carried fixing the wheel seat at 4 1/4, center 3 1/4.

The Central Railway Club proposed an amendment to Rule 12, that in case owners remove axles on account of defective wheels, the road responsible for damaging wheels shall not be charged with any difference in the value between axle used and that removed. The motion was carried.

Mr. McKenzie endeavored to have a committee appointed to revise the prices of wheels, and Mr. Schroyer one to revise the prices of all materials. Both of these motions were lost. Mr. Adams and others then tried to get the price of wheels reduced but failed in this.

The recommendation of the New York Railroad Club to amend Rule 16 by adding "cars should be marked M. C. B. pocket or stem drawbars," as the case may be, was considered and Mr. West moved its adoption, which was carried.

It was moved to amend Rule 17 now reading "wheels applied must be marked on the inside with the date, the initials of the road doing the work and the place where the work is done" by omitting the words "the place where the work is done and also the date" which leaves simply a provision for the initials of the road. This was carried.

The recommendation was made to change the last sentence of Rule 19 to make it read "cars originally equipped with link and pin couplers, with yoke attachments or tail pin attachments, shall be accepted, provided drawbars and attachments fit properly, have sufficient strength and are in good order." Mr. West moved the adoption.

Mr. Casanave asked for an explanation as the paragraph is not clear to him. Does it mean a car originally equipped with M. C. B. drawbar, that the drawbar may be replaced with link and pin and carded?

Mr. McKenzie said that it had reference to the link and pin drawbar only. This led to considerable discussion and Mr. Leeds announced that he does not believe in the M. C. B. coupler and never did; yet the Association has adopted a standard coupler and he proposes to insist on it that it shall be adopted or else those who will not adopt it must maintain their own. He opposed the recommendation to compensate anybody for using the link and pin. The motion to adopt the recommendation was finally lost.

The consideration of the Rules of Interchange covers many more items than those that we have reported and they can be better read in full in the official report of the Association.

Mr. Soule read the preliminary report of the Committee on Road Tests of Brake Shoes. The report was received and filed.

#### ROAD TESTS OF BRAKE SHOES.

The Executive Committee of the General Committee of Twelve on service tests of brake shoes, being Messrs. Soule, Mitchell and Morris, make a preliminary report. It appears that of the twelve railroad companies represented by the General Committee, five (the Pennsylvania, the New York Central, the Northern Pacific, the Chicago & Alton and the Central of New Jersey), have declined to take part in the tests. The railroads represented by the other seven members, the Chicago, Burlington & Quincy, the Burlington & Northern, the Lake Shore, the Erie, the Fitchburg, the Chesapeake & Ohio and the Norfolk &

Western), are conducting a series of service tests. These could not, however, be terminated in time for a final report at this convention, and therefore the Executive Committee requests that the committee be continued for another year. Each car under test has one truck equipped with soft cast iron brake shoes made at Altoona, and the other truck equipped with some one of the thirteen different kinds of shoes included in the tests. The shoes undergoing tests are given in the table herewith.

Mr. Rhodes said that some of the tests carried on are nearly completed and have developed great interest, and it



will be unfortunate if the results are not brought before the Association before June, 1895. He thinks that the committee when it gets its data together might publish the figures without making any comments on it.

Mr. Soule thought that the shoes undergoing trial will be sufficiently worn out to justify termination of its tests inside of three months. They might then be tabulated in another month. The trials as now going on are simply as originally contemplated. It is a trial of the qualities of the brake shoes, 13 different mixtures as against soft cast iron. When the committee is ready to announce the results, it will ask the brake shoe companies to name a market price and then will carry out the ratios to determine the value of each shoe as compared with the cast iron. The Pennsylvania Railroad company has agreed to furnish the reference shoes of cast iron, but it was found that there were so many thousand of them that the company could not furnish them without interference with its own business, and it was finally agreed that the cast iron shoes should be made of new material, no scrap.

The preliminary report of the committee on Laboratory Tests of Brake Shoes was read by Mr. Bush, the Chairman.

On motion of Mr. Barr, the Association authorized the Executive Committee to pay bills amounting in the aggregate to \$1,154.83, deducting \$500 previously appropriated for the expense of these tests.

The Committee on Wheel and Flange Gages, whose report has been recommended, announced its readiness to report again and was heard.

Mr. Barr gave an extended description and illustration of the gages mentioned.

Mr. Marshall moved that the recommendations of the Committee be submitted to letter ballot for adoption as standards.

Mr. Wallis explained that the recommended gage of 4 ft. 6 in. from the back of one flange to the running line of the other wheel is the important point. The distance between backs and over all will come right so long as this is kept correct.

Mr. Marden asked why it would not be right to measure between the backs of the flanges, as is done now.

Mr. Marshall explained that as the thickness of the flange decreases it is desirable to increase the distance between the backs.

Mr. Rhodes said that one of the difficulties in the matter is the variation in track gage, and that there can be no greater safety appliance than a uniform gage of track. It is well to mount wheels in accordance with the recommendations of the committee, but you must still attend to the track.

Mr. Forney suggested that the matter should be brought to the attention of the American Railway Association, so that the car department and the track department could be made to co-operate.

A motion to refer the committee's recommendation to letter ballot was carried.

Mr. Rhodes then moved that a Committee of three be appointed to confer at once with the American Railway Association, which was carried, and the President appointed Messrs. Barr, Rhodes and Marshall as such committee.

On Friday morning the Rules of Interchange were again taken up.

Clause (r) of Rule 3 was modified to make the gage between the backs of flanges 4 ft. 5 in., instead of 4 ft. 5 1/2 in.

The report of the Committee on Prices, as embodied in Rule 26, was presented by the Chairman, Mr. R. E. Marshall. The Committee recommended no changes, except that the M. C. B. standard bearing for 3 1/2 x 7 in. journals weigh 10 pounds; that box or stock car half side door, applied, be listed at \$3, and recommended also to remove from the list the prices for M. C. B. couplers and attachments, and insert a new paragraph, to read, "M. C. B. couplers or parts to be charged at current market prices, which are to be quoted by the Secretary semi-annually; credits to be allowed at scrap rates as given in the above list."

Mr. J. H. McConnell submitted a minority report, recommending that Rule 26 be amended to allow an additional price of 10 per cent. for all labor and material furnished by railroads in certain States named, being those west of the Missouri river. This recommendation was considerably discussed, but lost, and the majority report was adopted.

Mr. Soule moved that if the proposed wheel gage be adopted as standard, the Executive Committee shall secure from a responsible manufacturer a proposition furnishing the gage at a stipulated price. This was carried.

The Chairman of the Committee on Steel Tired Wheels, whose report was referred back to the Committee for certain changes, reported that the Committee had not been able to make the changes suggested, and the recommendations were adopted.

On motion of Mr. Mitchell, the rules were changed to provide that wheels under passenger cars be condemned for passenger service when worn to the dimensions fixed in the report of this Committee, which was carried.

The report of the Committee on Safety Chains was also recommended on the first day, but the Committee declined to make any change, and it was decided to submit the recommendations to letter ballot.

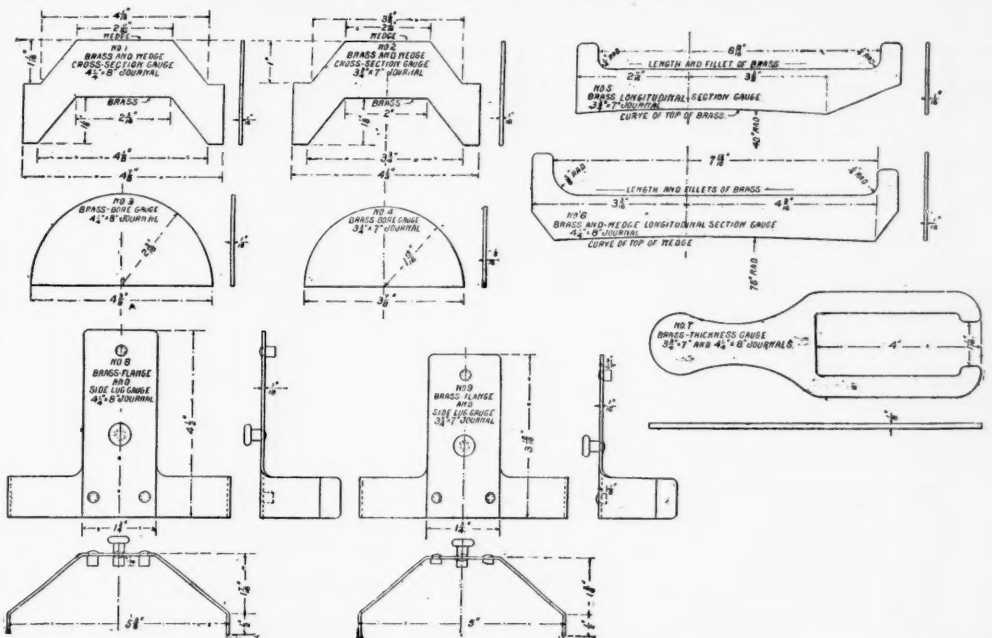
The report of the Committee on Automatic Coupler Standards and Limits was then read.

#### AUTOMATIC COUPLER STANDARDS AND LIMITS.

The report of the committee on this subject, Mr. J. M. Wallis, Chairman, recites the history of the coupler tests,

gives illustrations from photographs of the drop testing machine built at Altoona, gives a descriptive table of the couplers tested, a tabular summary of results, and a detailed report of the individual tests, accompanied by photographs, showing how the couplers failed. This whole matter is complex and involved to such a degree that no summary of any value can be made of the report without a great deal of study. In general we may say that the results of the tests show that out of 92 couplers 22.8 per cent. of the knuckles were broken outright and 30.4 per cent. of the couplers broken either in the head or shank. Of knuckle failures, 70 per cent. are in the tongue and 14 per cent. in one or both of the lugs; 68 per cent. of the failures are broken shanks, 27 per cent. broken guard arms and 18 per cent. broken locks. In actual service, as is well known, the guard arm failures predominate; but here we see the shank failures much in excess. The explanation is probably in that the direct blows concentrate the shock on the shank, whereas a slant blow, or one from a broken link and pin coupler, breaks the guard arm alone. Couplers not fractured in the general test were subjected to an extra guard arm test, to destruction, and in these it was found 33 failed from broken shanks and only one from broken guard arm; although in six, the guard arms were so much bent as to preclude further test. The Committee calls attention to the necessity of a revision of the dimensions of the shank immediately behind the head. The Committee also calls attention to the fact that out of 114 couplers presented, representing 25 different kinds, only 20 individual couplers wholly complied with the M. C. B. limit gages.

The results show that the strongest coupler will be made of steel, but the worst steel bar is not as good as the best malleable iron; although the best steel coupler is superior to the best malleable iron coupler, and the poorest steel coupler is better than the poorest coupler of malleable iron.



Proposed Gages for Car Brasses—M. C. B. Committee on Lubrication.

Nevertheless, the use of malleable iron for couplers is not disapproved by the Committee.

On motion, the report was received and the Committee discharged with thanks.

Mr. Rhodes spoke of the valuable work done by the coupler committees. He said that it had not cost Mr. Wallis' company less than six or seven thousand dollars to conduct these tests, and it seems odd to accept the report and discharge the Committee.

Mr. Wallis said the machine is standing at Altoona, and is at the disposal of the M. C. B. Association or any manufacturers who wish to use it.

Mr. Barr supported Mr. Rhodes, but Mr. Marshall's motion to discharge the Committee was carried.

The report of the Committee on Heating Passenger Equipment was read by the Secretary.

#### HEATING PASSENGER EQUIPMENT.

The committee on this subject consists of Messrs. Hoffecker, Wilson, Hodge, Macbeth and Cromwell. The committee has answers from 30 roads which have 5,869 cars equipped with steam heating apparatus, and 6,432 cars not equipped. It also has answers from 12 roads with 2,414 cars, none of which are equipped for steam heating. The aggregate mileage answering is only about 47,000 miles, and the total of cars represented by the roads answering is about half of the total passenger car equipment of the United States. The committee has accumulated considerable information which will be of some use to people investigating the subject. It finds that an automatic pressure reducing valve on the steam pipe, at the locomotive, is used by much the larger part of the roads replying; also that an automatic device for controlling temperature in the car is not nearly so popular as control by the trainman; that in much the larger number of cases the water from condensation is disposed of by traps, and that only a very small percentage of the cars replying have any trouble of water from condensation freezing.

The report was received and the committee discharged. A report was received from the Committee on Ventila-

tion, and one on Lighting, prepared by the Secretary. We have not received copies of either of these reports.

The report on Lubrication of Cars was then presented, and an abstract follows.

#### LUBRICATION OF CARS.

The M. C. B. Committee on this subject consists of Messrs. A. M. Waitt, W. H. Thomas, I. E. Wood, F. A. Stinard and W. K. Carr. The Committee makes a long report, and recommends certain standard gages, as shown in the engravings which we reproduce. The Committee first draws a horrible picture of the general practice in freight car boxes and journal lubrication, and then regrets a general lack of information in reply to its circulars. Only 46 roads replied, representing about 576,000 cars.

Oil is generally preferred to grease, no road using grease exclusively. The oil used varies from cheap crude oil at 5 cents a gallon to the best refined Galena oil at 35 cents. Twenty-one of the roads replying use Galena oil, 17 use common black oil, and 8 either special oil or mixtures. The cost of oil per thousand miles per car varies from 6 cents to 41.6 cents on passenger cars, and from 6 cents to 26.3 on freight cars.

Twenty-one of the roads use special cooling compounds. Of the 25 which find no need for a cooling mixture, 21 use the high grade Galena oil. Of the 21 roads using cooling mixtures 2 report poor results, 7 fair, 11 good, and one very good, and the Committee believes that many, if not most cars could be equally well cared for if the trainmen used a proper quantity of freshly soaked waste and oil carefully applied.

Twenty-one of the roads replying keep a record of hot boxes, but the Committee concludes that the records are not very reliable. The number of hot boxes runs from one for every 5,360 miles, to one for every 1,000,000 miles, the average being about one to every 20,000 miles. Obvi-

ously, an average from data with such wide range cannot be worth anything. The records show that the quality of the lubricant is only one of many details in preventing hot boxes. The amount of oil used per 1,000 miles run also varies widely, namely, from 0.6 gallon up to 4 1/2 gallons on passenger equipment. Most of the cars use on passenger equipment from one to two gallons per car per 1,000 miles. In freight service the minimum amount of oil reported is a little less than 1/2 gallon per 1,000 miles, and the maximum 2 1/4 gallons. There is no agreement as to the kind of packing to use, but the Committee recommends a good grade of all wool waste. Opinions as to the comparative freedom of iron and steel axles from heating are about equally divided, and the subject of proper mixtures and metals for journal bearings is also very undecided. All but two of the 40 roads favor a solid lead-lined journal bearing, and all agree that the journal bearings should be ground or bored and lined on a radius larger by 1/2 of an inch than the journal. It is astonishing to the Committee to find a few roads which neither bore nor grind their journal bearings, but simply clean the surface of the bearing and coat with from 1/16 to 3/16 in. of lead. The Committee recommends that the subject of lubricating oils be made a special subject for a committee for next year. The Committee recommends, as we have said above, wool waste without any cheapening fibre introduced. It should be a universal rule written up in every shop that all waste must be well soaked in oil for at least 24 hours before being used, and, if possible, 48 hours; then to avoid waste of oil it should be drained before using, and the Committee shows a drawing of a convenient form of box for draining.

The Committee recommends a committee for next year on the subject of journal bearings, and is surprised to find that only 7 out of 45 roads test their journal bearings and wedges to see if their dimensions are correct. Over 75

per cent. of bearings removed from some 200 or more cases of hot boxes, show that either they did not fit in the key properly or else there was no provision made for the bearing to adjust itself. The Association has provided for adjustment by rounding the top of the bearing and of the key, but many roads overlook the need of this adjustment. The Committee recommends to the Association the changing of the present standard,  $3\frac{1}{4} \times 7$  in. journal bearing and key to that given for the  $4\frac{1}{4} \times 8$  in. bearing and key; that is, to make the top of the bearing straight and curve the top of the key. The Committee also recommends that journal bearings and keys be required to pass the inspection and test of gages shown in the engraving reproduced. The uses of these gages are indicated in the engraving.

The Committee makes some recommendations designed to secure greater perfection in the axles themselves, also designed to improve the construction and inspection of trucks. The Committee also formulates some detailed instructions for inspectors, providing for oiling at proper intervals, and for doing the oiling in the proper way.

thought this was a point that should be investigated. On motion of Mr. Marshall, amended by Mr. Leeds, the recommended change in bearing and key is to be submitted to letter ballot, as well as the recommendations as to gages, and the Committee is continued for another year.

The report on Air Brake and Hand Brake Apparatus was then read.

#### BRAKE APPARATUS.

The Committee on this subject is Messrs. Bronner, Leeds, McGee, McWood and Siddons. The Committee suggests that the hand brake on passenger cars is practically useless in many cases, because it is so placed that it cannot be worked when the car is coupled to a vestibule car, and because the hand wheel is so small that the proper power cannot be realized. It suggests that it would be well to have a committee appointed to look into this matter.

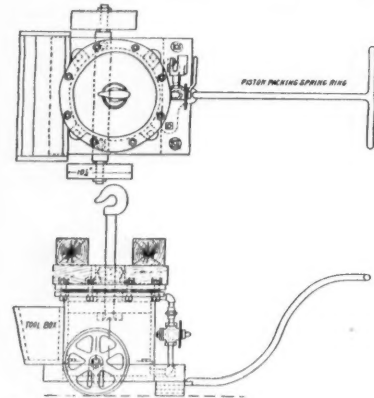
The strength of the report is given to the maintenance of air brakes on freight cars. The Committee got forty replies to its circular, representing about 600,000 cars, and

atic and rigid air tests will involve large expense and delay on account of the time required and the extra switching. Having the proper standard of efficiency in the conduct of the main shop so that the cars go out from there with their air-brake apparatus in proper condition, the next step would be to equip light repair shops and outside repair tracks with air compressor, piping, etc., to reach every car coming to the repair tracks for any cause. A very large number of cars will be reached this way without any extra switching.

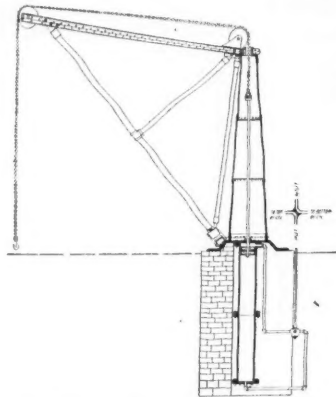
The next stage would be to improve the methods of terminal and interchange inspections, and the obvious method would be to use the same methods as on the repair tracks, and the Committee cites a case where this method has been put into practice. The tracks where interchange cars are received, and from which trains are sent out, are supplied with air at standard pressure with connections every 36 feet. When a train is received air is at once applied, and the inspection and light repairs to the brake apparatus go on simultaneously with the ordinary inspection and light repairs of other parts. No extra time is found to be required, and very few cars are switched out for repairs, most of the work being done in the train. If a triple valve is found not efficient, it is replaced entirely; a new one can be put in in less than 15 minutes; it has been done in 7 minutes. Then the one taken out can be put in order at leisure. This plant was found surprisingly simple, efficient and cheap. There is an 8-inch air pump, a locomotive air reservoir, and the yard is piped with 1-inch wrought iron pipe laid on the ties and held in place by loose staples, so as not to interfere with contraction and expansion, and 18-inch branch pipes are attached every 36 feet, having cut-out cock and about 12 inches of hose, with 1-inch air-brake coupling. The men are supplied with a hose 8 or 10 feet long, with double couplings, and thus they are able to reach any part of any train. The plant has 8,500 feet of pipe, and at 2,000 feet from the pump but 1 lb. of pressure is lost from that indicated at the pump.

The Committee does not undertake to elaborate a method for inspection and repairs of freight train air-brakes which will be applicable to all roads; but it does preach a very good sermon, and we trust that its exhortation will be useful. It ought to be, for it is enforced with plenty of practical knowledge.

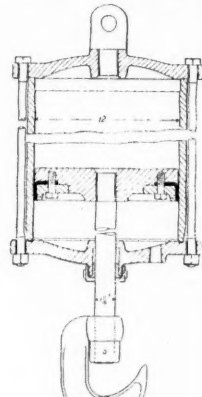
Certain changes in the Rules of Interchange are presented for adoption. The question, if cars are found not complying with paragraphs 7 to 23, Rule III., Section S, are you in favor of making the necessary work chargeable to owners? is a serious one. Eight companies reply no, 30 answer yes, which indicates a strong sentiment toward making Rule 8 cover repairs and attention to air-brakes. This would aid in maintaining the efficiency of the brake, but it will discourage the application of air-brakes to their cars by private lines, and permit companies that have no brakes, who use the brakes on foreign cars, to thrive at their neighbor's expense. The last objection might be met by providing that the company must have 25 per cent. of its own cars equipped before it can make bills for maintenance of air-brakes on foreign cars. A committee is asked for to consider this matter and bring it before the next convention.



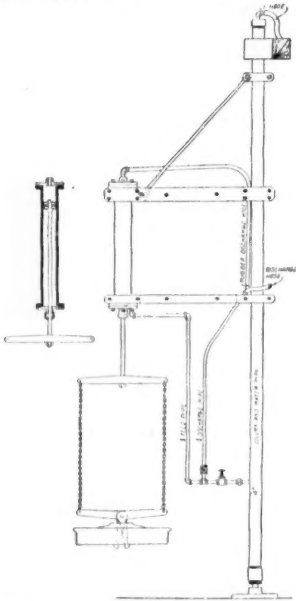
Pull Down Jack—Northern Pacific.



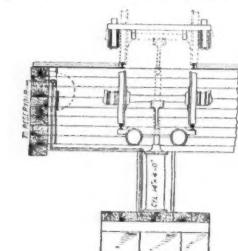
5-ton Hydraulic Crane—Delaware & Hudson.



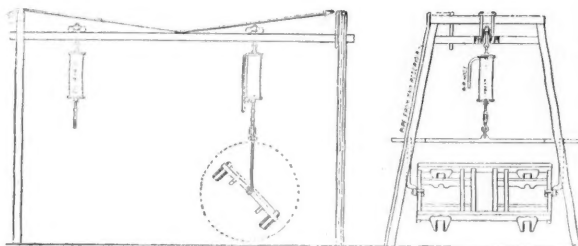
2-inch Air Hoist—Chicago Burlington & Quincy.



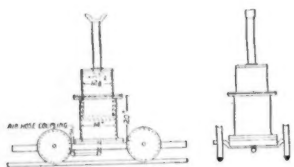
Hydraulic Wheel Crane—Delaware & Hudson.



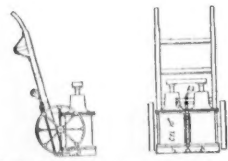
Pit Jack—Lake Shore & Michigan Southern.



Pneumatic Hoists—Lake Shore & Michigan Southern.



Truck Jacks—Lake Shore & Michigan Southern.



Pneumatic Hose Machine—St. Louis Southwestern.

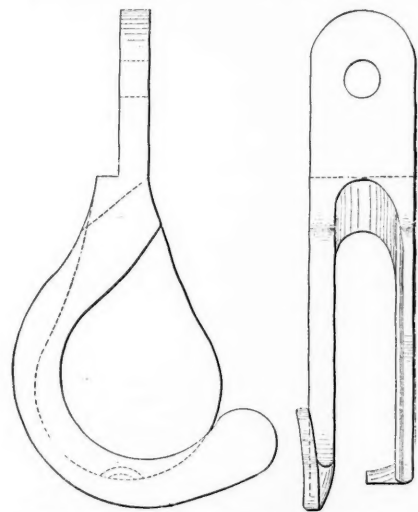
#### EXAMPLES OF PNEUMATIC AND HYDRAULIC MACHINES—M. C. B. COMMITTEE.

Finally, the Committee recommends that oil cans and clear oil be once and for all removed from and forbidden to be used in shops, shop yards, and by train crews. The reason for this is that most cases of heating come from the waste sagging away from the journal, thus feeding no oil up. If more oil is poured on, the journal is lubricated only for a few minutes, but if, instead of oil, the dope bucket is used, and a small quantity of freshly soaked waste, good results will be had.

In the discussion of this Mr. Barr said that a couple of his most intelligent foremen had called his attention to the fact that good old waste which had been in a box for a long time is better than fresh soaked waste, even if it has been soaked for three or four days, or more. He

finds that little systematic testing or caring for freight air brakes is done after the cars leave the shops. Only 11 companies out of 40 have any testing plants outside their main shops, and those only at the larger repair points. Thirteen companies insist on the conditions prescribed in the rules; 27 do not. Only three companies have air-brake testing plants at interchange points. Twenty-eight companies out of 40 make their air-brake inspection by observation only. Most of those that make inspection by air-brake engine, simply make the cars safe to run. Only seven companies have any system of marking cars with air-brake defects. Twenty-seven companies have no report whatever from trainmen.

The Committee says the prevalent idea is that system-



Proposed modification of dummy coupling hook.

A modified dummy hook coupling recommended by the Central Railway Club is also recommended by this company. The point of the hook of the present dummy coupler is enlarged, which saves injury to gaskets, and help to exclude dirt when the coupling is hung up.

On motion, the recommendations of the Committee are to be submitted to letter ballot, and the Committee is continued another year.

The report of the Committee on Compressed Air Appliances and Hydraulic Machines was then read.

#### COMPRESSED AIR AND HYDRAULIC APPLIANCES.

The M. C. B. Committee on Compressed Air and Hydraulic Appliances, consists of Messrs. Barber, Skinner, Garstang, Preston and Cormack. The Committee has made a very interesting and valuable report, going into a comparatively new field, and one which the mechanical officers of the railroads have been singularly slow about occupying. We reproduce from the report a number of



the engravings which the Committee has collected, showing various appliances. Others have already been published in our columns, and others we omit merely for want of space.

The Committee concludes that air appliances are in limited use in car shops and yards, only a small percentage of the railroads being fairly equipped, and yet those who have had experience with such machinery are unanimous in its favor; it is so economical and convenient. A long list of the various applications of pneumatic power in car shops and yards is given.

The most common method of getting pressure now is by using locomotive pumps. But where more pressure is required than can be furnished by one pump it would probably be more economical to put in a special plant, and the Committee makes recommendations on a few points to be observed in establishing air plants.

The Committee saw a number of examples of economy in the use of pneumatic tools. For instance, the use of pneumatic jacks in drop pits save 47 per cent. in the work of changing wheels in passenger trucks. Devices for cleaning cushions save 85 per cent. of the time. By the use of the pulling-down jack for pulling down defective centre sills and other parts of car framing, two men did in 5 minutes and 10 seconds what they would have taken from 30 minutes to one hour to do with ordinary arrangements. Special attention is invited to air appliances for putting the fittings on air brake and steam hose, especially as used on the New York, Lake Erie & Western, where one of these machines does the work that would take eight men to do by hand. Moreover, these machines have other advantages in that rusty couplings can be used or hose can be made so that it will take from 20 to 30 lbs. pressure to apply couplings, reducing the liability to blowing off. With one or two of these machines at convenient points the stock would be concentrated.

The Committee received from the Delaware & Hudson Co. a blue print showing the uses of hydraulic machinery in car shops, which is reported to have made a noticeable saving in labor. The report is represented simply as a preliminary step.

Mr. West said that this is one of the most valuable reports that the Association has had, and moved its acceptance with thanks to the Committee, which motion was carried.

The report of the Committee on Freight Car Trucks was then read.

#### FREIGHT CAR TRUCKS.

This Committee consists of Messrs. J. J. Hennessy, Samuel Irvin, William Voss, J. H. Davis, and F. H. Stark. The Committee received from six to forty-four answers to each of nineteen questions and the answers are only moderately useful. The great majority advise a standard size and shape for arch bars and channel transoms for diamond trucks. The recommendations for length of wheel base vary from 4½ ft. to 6, and so with regard to other parts, the variations in the answers make them of little value. With regard to the question concerning the most practical and economical truck to maintain, forty replies were received, of which twenty-eight favor the diamond, rigid truck, five the swing motion, five the Fox, one the Shaff-American, and one a rigid centre with equalizer or independent springs over the boxes.

As to brakes attached to trucks or car body, forty-three replies were received; fifteen would attach them to the car body, twenty-eight to the trucks. In answer to the question—how many trucks are in use built entirely of iron and steel, twelve replies were received, giving 1,544 cars with the Fox pressed steel, 4 cars with the Drexel, 4,000 with the Thielsen and American. The replies as to experience are generally favorable for the Fox. A road having 1,100 cars with the Drexel has got good results. The road using the American cast steel bolster, number of cars not given, makes a favorable report. With regard to metal bolsters, only six answers were received, four saying they are good if properly constructed, one that they are too expensive, and one that they settle with loads and do not come back, requiring shimming of the center plate. These replies are too fragmentary and represent too little service to be of much value. The Committee thinks that the Association should pay especial attention to the Fox, the Drexel and the American cast steel bolster truck.

The Committee recommends a 5 ft. wheel base, and for standard sizes of arch bars ¼x4 in. for the top, 1x4 for the bottom, ¾x4 in. for the tie bar. It considers it useless to recommend designs for arch bars as they would not be approved by the Association, there being no uniformity in practice.

The recommendations of the Committee were, on motion, to be submitted to letter ballot, with an amendment changing the wheel base to 5 ft. 2 in.

The Committee on Subjects for the next meeting asked to be allowed to defer reporting until it had time to communicate by circular with the members. On motion of Mr. West, this privilege was granted, and the number of subjects limited to ten.

The Secretary gave notice that at the next annual meeting the following amendment to the Constitution would be offered for adoption: "Representative members shall have one vote on all questions, and in addition thereto, shall, on all measures pertaining to the revision of the Rules of Interchange, and to the adoption of the standards, or to the expenditure of money," etc.

The Secretary announced that word had been received of the death of W. H. Traham, and the President appointed the following gentlemen as the Obituary Committee: W. S. Morris, R. D. Wade, J. M. Holt,

The election of officers was then in order, and the following gentlemen were elected:—

President, J. S. Lentz.

Vice-President, S. A. Crone.

Second Vice-President, E. D. Bronner.

Third Vice-President, J. C. Barber.

Treasurer, George W. Demarest.

Member of Executive Committee to fill unexpired term of J. C. Barber, Samuel Irvin. Three members of the Executive Committee, J. T. Chamberlain, G. W. Rhodes, Pulaski Leeds.

Mr. John W. Cloud was reelected Secretary.

After a vote of thanks to the retiring officers, the Convention adjourned.

#### Track Circuit Connection for Lock-and-Block Signaling.

Mr. J. P. O'Donnell, the well-known English signal engineer, has devised an arrangement for operating lock-and-block apparatus, (in working the block system after the usual English fashion), by the use of the rails of the track instead of a wire upon poles, for communicating from one station to another. By this means the operators in the cabins every time they exchange signals are assured that the track between them is clear and unobstructed.

The arrangement, as described in the drawing shown herewith, is the same in principle as that of the lock-and-block apparatus devised by Messrs. Sykes, Jr. & O'Donnell, to be operated by a wire circuit. The drawing shows the apparatus as arranged for moving trains from A toward C. The "signal replacer" referred to in the description is an apparatus devised by the inventors for performing the functions of an electric slot. We expect to describe this in a future number. By its use an electric current, closed either by a train or by the hand of the signalman, disconnects a semaphore signal from its operating lever, allowing the counterweight to throw the arm to the danger position. In the drawing figures 7 and 7<sup>a</sup> are elevation and plan illustrating the receiving instrument at station A. Figures 8 and 8<sup>a</sup> are elevation and plan of receiving and sending instruments at station B, figures 8<sup>b</sup>

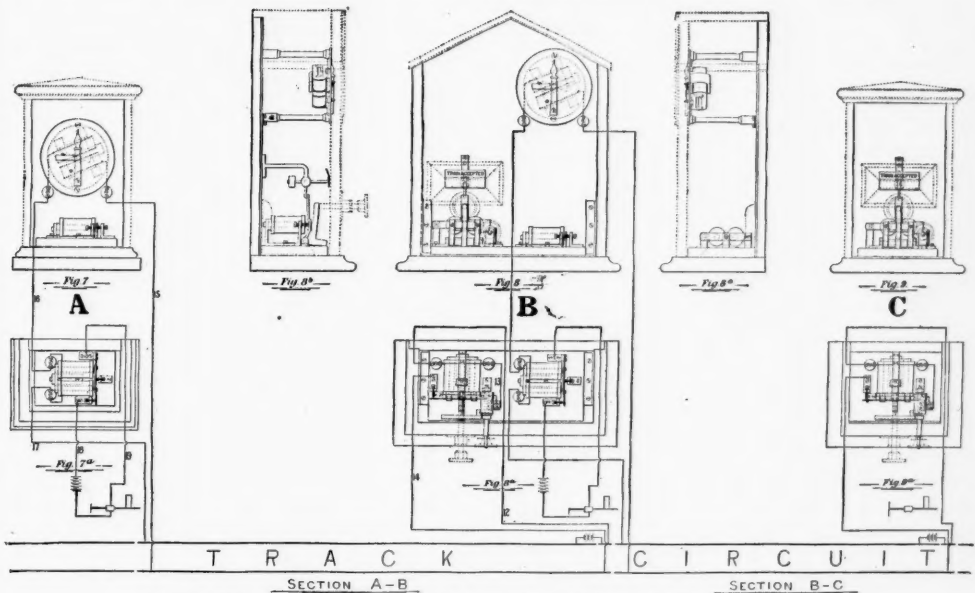
The main circuit between B and C is identically the same as that between A and B.

In the local battery and circuit at A, brought into action by the relay, the current starts from the copper of the battery, flows by wire 18 to the armature of the relay, from the armature of the relay by wire 19 to the signal replacer on A's starting signal, and from there back to the zinc of the battery.

In operation, when B plunges, he completes the main circuit between A and B, and this causes the miniature semaphore arm at A to assume the "safety" position; it also attracts the armature of the relay at A, and brings into action the local battery and circuit at that place, and it is then within the power of the signalman at A to lower the starting signal by operating his lever for that purpose. The act of plunging causes the tablet at the plunging station to show "TRAIN ACCEPTED."

Supposing a train to be approaching A, which it is intended shall proceed through the sections A-B and B-C:

A will ask B by bell for sanction for the train to enter his section; B will plunge. This act will indicate to A, by the lowering of the miniature semaphore at his post, that B has accepted the train, will engage the signal replacer on A's starting signal, and cause the tablet at B to show "TRAIN ACCEPTED." A will lower his starting signal and immediately the first pair of wheels of the train enter upon the section A-B, this signal will automatically return to danger by the short circuiting of the main circuit between A and B through the axle of the wheels, which will cause the armature of the relay at A to fall back, breaking the local circuit, and, through the signal replacer throwing the semaphore arm to danger, the miniature arm at A will at the same time return to the "danger" position. B now asks and receives the sanction from C for the train to proceed into the B-C section, the same operations being gone through as were gone through by A and B. When the train enters the B-C section the same will take place with regard to the miniature semaphore arm at B, and the signal replacer on B's starting signal as took place at A; at the same time the tablet at B will change from "train accepted" to blank through the short circuiting of the main battery at B by the passage of the first truck making contact between the short insulated length of rail to which the copper of the bat-



Sykes & O'Donnell's Lock-and-Block Apparatus, with Track Circuit Connection.

and 8<sup>a</sup> being side views of the same. Figures 9 and 9<sup>a</sup> are elevation and plan of the sending instrument at station C.

The instrument at A consists of a miniature semaphore arm to indicate the state of the section in advance; and of a relay brought into action by the station in advance. This relay brings a local battery into circuit with the signal replacer on the advance starting signal at A.

The instrument at B, as regards the receiving portion, is the same as that at A. The sending portion consists of a means of "plunging," the use of which makes the circuit through the coils of the miniature semaphore and the relay at A; and actuates a tablet at B, normally showing blank, and abnormally "train accepted." There is also in connection with this instrument a switch which the inventors have designated the "suspension switch." The instrument at C is similar to the sending portion of the instrument at B. A single track is illustrated diagrammatically, with the connections between the track and the various instruments.

In the main circuit between A and B, the copper of the main battery at B is connected to a short insulated length of the near rail, this short insulated rail by wire 12 to the coils of the plunger electro-magnet of the sending instrument at B, those coils by wire 13 to one of the contacts of the "suspension switch," the other contact of the suspension switch to the armature, and the armature by wire 14 to the off- which the current flows trail, through A. At A the current passes through wire 15 to the coils of the miniature semaphore arm, thence by wire 16 to the coils of the relay, from there by wire 17 to the near rail, and back through that rail to the zinc of the battery at B.

tery is connected and the other portion of the near rail to which the zinc is connected. Should C after having given sanction to B desire that the train should not enter his section, he uses the "suspension switch." This locks the armature of the plunger in the position at which it already stands, that is, main circuit made between B and C, but the switch itself breaks this circuit and the miniature semaphore arm at B is returned to the danger position. The starting signal at B, if it has been lowered by the signal man at that place, will also return to the danger position, and the tablet at C will change from "train accepted" to blank. After C has performed any switching movements that may be required, and for which it is supposed he has blocked the train in the rear, the reversal of the suspension switch will make the circuit again and cause the miniature semaphore at B to resume the safety position; it will also re-engage the starting signal at B and "train accepted" will appear on the tablet at C. Supposing that at the time C wished to suspend the sanction which he has already given to B, and that the train for which the sanction was given has already entered the section B-C, the main circuit as regards B will have been short circuited by the action of the train entering the section, and the miniature arm at B will be in the danger position.

The apparatus here described is on exhibition at the office of the National Switch & Signal Co., 32 Liberty street, New York, which company controls the American patents. There is, of course, no track circuit in the exhibit, but the apparatus, including the signal replacer, is full size, and wires are used as conductors in place of the rails.

### Montreal Meeting of the Mechanical Engineers.

We continue from page 421 our report of the Montreal meeting of the American Society of Mechanical Engineers.

Thursday morning was devoted to the reading and presentation of six papers, all relating to the steam engine; but as the discussion covered ground and points which have often been brought up heretofore, and are largely due to the point of view from which the problems are approached, we can omit them at present.

Mr. M. P. Wood presented a paper on "Rustless Coating for Iron and Steel." He included some account of tinning and enameling metals, lacquering and other preservative methods. The paper is an excellent summary of the various processes, with references to the literature of the subject, and for that reason will be especially useful. It begins with a brief account of the Bower-Barff process of protecting wrought iron, steel and cast iron with a magnetic oxide, the protective layer being formed at the cost of the metal itself. Various modifications of these processes are described. The Gesner process is then described, which claims to change the surface into a compound of hydrogen, iron and carbon. These processes are described at considerable length. The writer then treats of the inefficiency of the ordinary methods of painting iron structures, and illustrates by examples the fact that ordinary painting might be very efficient, and often is, if the iron is first cleaned and scaled and then is painted with honest paint mixed with honest oil.

This paper elicited some information based upon experiments made in 1883-1885, and 1891 and '92, going to show that electric action may be the main cause of corrosion.

Mr. James McBride presented a paper on "Corrosion of Steam Drums." He described various experiments, the results of which may be summed up in his conclusion that corrosion is due primarily to excessive moisture in the steam in the drum, due to entrained water and surface condensation; that the trouble is aggravated when no provision is made to drain away the water. He considers it useless to attempt to have the water drained back through the steam pipes, but that special pipes should be provided.

Mr. Hawkins maintained that the impinging water may wear away metal at a point of change of direction of flow, and that in this particular case corrosion is due to impact of water entrained in the steam.

Messrs. Randolph, Grimm and Mason all ascribed the corrosion to erosive action of water, while Mr. Holloway believed that in the experiments quoted it was due to cinder in the iron.

Mr. McBride then made a sketch to show that the corrosion did not occur at those points which would be subject to impact of entering steam or water, but in almost every case at some distance from them. It seems possible that this corrosion (wasting away), which leaves the metal in a clean and almost silvery condition, may be due to electro mechanical action.

Mr. Charles Wallace Hunt presented an ingenious and interesting and short paper on "A New Mechanical Fluid," his fluid being simply hard balls, as, for instance, bicycle bearing balls. He showed by engravings and models a rod fitted up to be adjusted by introducing a mass of balls behind the bearing, with a set screw to regulate the mobility of the balls. One side of the bushing is held in place and adjusted by the presence of a mass of hardened steel balls varying from 1/8 to 1/4 of an inch in diameter. Between the bushing and the balls is a thin plate of hardened steel to prevent the balls from indenting the softer metal. Forty bearings of this type have been running last year in various places working with steam boiler pressure from 80 to 160 lbs., giving pressures per square inch of projected area of the pins ranging from 600 to 1,000 lbs. The pressure per square inch on the balls is about 50 per cent. greater; each ball sustains 15 to 25 lbs. pressure.

Mr. W. S. Rogers said that he had used lead shot in bearings for many years, and found it to give great satisfaction, and was sure that this new device would also be useful.

Mr. J. A. Brashear pointed out the interesting fact that when balls like these, but of uniform size, are allowed to flow from an orifice, their rate of flow remains constant, and independent of the depth of the column of balls above the orifice. This, he explained, was no doubt due to the friction between the balls themselves and the sides of the containing vessel.

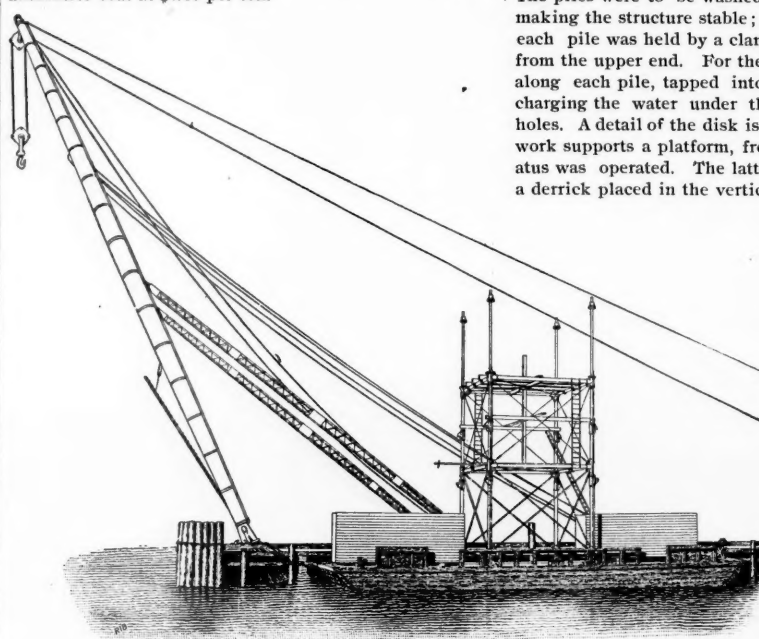
Prof. F. R. Hutton presented an interesting paper on "The First Stationary Steam Engines in America." The first record that he has is from Mr. W. F. Durfee, who says that in the last year of the eighteenth century there were but three steam engines in the United States; one of these was used, and probably built by Oliver Evans, of Philadelphia, for grinding plaster; another was an imported engine built by Hornblower, and used in the Schuyler copper mine near Belleville, N. J.; the third was somewhere in New England, but just where, Mr. Durfee does not know. Considerable other information, much more in detail, was unearthed by correspondence, and engravings are given of a Watt engine of 1845, and of a Boulton & Watt engine of 1815. The whole paper is of considerable antiquarian interest, but we cannot take space now to reproduce it.

Mr. Decourey May presented an interesting paper on "The Cost of an Indicated Horse Power," which is summed up in the table reprinted herewith. In the compilation he puts interest at 5 per cent., depreciation at 5

per cent., insurance and taxes on three-quarters of the cost of the plant at 2 1/2 per cent.; no rental or interest on land occupied, or cost of water is charged. Figures for engines below 50 horse power vary so widely that he has omitted them.

	Cost of one I.H.P., 365 days of 24 hours.				Cost of one I.H.P., 308 days of 10 1/4 hours.			
Coal per 2,240 lbs. . . . .	\$2	\$3	\$4	\$5	\$2	\$3	\$4	\$5
Triple expansion pumping, Allis, 20 revs. . . . .	48	55	61	67	31	33	35	37
Triple expansion without pumps, Allis, 50 revs. . . . .	27	33	39	45	16	18	20	22
Compound mill, best engine. . . . .	29	36	44	51	17	19	21	24
" " average. . . . .	39	46	52	58	22	25	28	30
" " electric light, average. . . . .	122	139	157	174	78	84	90	96
Triple expansion trolley. . . . .	48	58	68	79	29	32	36	39
Condensing mill. . . . .	45	54	64	74	26	29	33	36
Non-condensing, 50 to 200 H. P. . . . .	44	52	61	69	25	29	33	38
	70	76	81	88	49	53	57	62

Mr. A. A. Cary showed that the cost of an indicated horse power was dependent upon size of engine and almost in every case dependent upon local conditions, and gave a fair value in New York, \$46 to \$47, with anthracite coal at \$4.80 per ton.



Framework and Pontoons on Scow.

Mr. Hart stated that the cost of feed water and of condensing water must be taken into account, while Mr. Holloway pointed out that comparisons could only be made with engines of similar type. The cost of one horse power, as given by various memoranda, varied from \$32 to \$56, according to type, location, cost of fuel, etc.

A paper on "Mechanical Draft," by Mr. W. R. Roney, was presented, and the conclusions as to the economy of mechanical draft endorsed in the discussion.

Other papers were "Results of Measurements of Water Consumption of a 1,600 Horse Power Engine," by Professors Denton and Jacobus and Mr. Rice, and "Notes on Corrosion of a Cast Steel Propeller Blade," by Mr. Frank B. King.

As the shops of the Canadian Pacific Railway were not in operation, one of the most interesting visits was omitted, but the others, viz., the passage over the Lachine Rapids and by the harbor works, and the visit to the power station of the electric lines were made.

The annual breaking up of the ice causes such great damage to wharves and houses along the water front that a guard pier is now being constructed, running from the shore end of the Victoria bridge out to a point about 3,000 feet beyond the mouth of the Lachine Canal, and about one-quarter mile from the quays along which the wharves will extend outward and down stream at an angle of about 45 degrees to the direction of the current. As soon as this guard pier is complete, vessels which must winter in the harbor of Montreal will be entirely safe against injury by ice, and as Montreal is growing very rapidly as a business center, this improvement has become absolutely necessary. When the entire harbor works are complete there will be a well defined ship channel from the mouth of the Lachine Canal to the sea, at all stages of the water, with ample accommodations for any number of deep draught vessels.

### The Borings on the Outer Diamond Shoals.

We have mentioned briefly the fact that some interesting work has been done by the Lighthouse Board in borings to determine the character of the ground on the Outer Diamond Shoals, off Cape Hatteras. It will be remembered that this is the place where the Lighthouse Board has long wished to get a lighthouse built, and where Anderson & Barr lost a caisson two or three years ago. Capt. Price, Corps of Engineers, U. S. A., Engineer Secretary of the Lighthouse Board, has sent us information and prints with regard to the construction of the apparatus used in making borings, from which the engravings herewith are reproduced and the description compiled.

The apparatus consists of a square skeleton, 20 ft. wide and 32 feet high, built up of four hollow, wrought iron columns, braced vertically by hollow iron struts and tie rods. Through each column passes a solid disk, 6 in. in diameter and 50 ft. long, with a cast iron disk of 3 ft.

	Cost of one I.H.P., 365 days of 24 hours.				Cost of one I.H.P., 308 days of 10 1/4 hours.			
Coal per 2,240 lbs. . . . .	\$2	\$3	\$4	\$5	\$2	\$3	\$4	\$5
Triple expansion pumping, Allis, 20 revs. . . . .	48	55	61	67	31	33	35	37
Triple expansion without pumps, Allis, 50 revs. . . . .	27	33	39	45	16	18	20	22
Compound mill, best engine. . . . .	29	36	44	51	17	19	21	24
" " average. . . . .	39	46	52	58	22	25	28	30
" " electric light, average. . . . .	122	139	157	174	78	84	90	96
Triple expansion trolley. . . . .	48	58	68	79	29	32	36	39
Condensing mill. . . . .	45	54	64	74	26	29	33	36
Non-condensing, 50 to 200 H. P. . . . .	44	52	61	69	25	29	33	38
	70	76	81	88	49	53	57	62

diameter at its lower end and a screw thread and cast iron flange nut at its upper end. The tower was to rest on the bottom of the shoal on two beams, each of one 8x12 in. and one 12x12 in. timber, fastened to the lower struts. The piles were to be washed 13 ft. into the shoal, thus making the structure stable; while in its upper portion each pile was held by a clamp fitted into a recess 15 ft. from the upper end. For the water jets a 3 in. pipe ran along each pile, tapped into the bottom disk, and discharging the water under the pile through two 1 1/2 in. holes. A detail of the disk is given in Fig. 3. The framework supports a platform, from which the boring apparatus was operated. The latter was handled by means of a derrick placed in the vertical axis of the structure.

Fig. 1 shows the structure in position on the shoal. The tower was given buoyancy by two water-tight wooden pontoons, which were fastened to opposite sides of the former. Each pontoon is 9 ft. high, 6 ft. wide and 20 ft. long. It consists of 12 parallel rectangular yellow pine frames, which are connected by four 8x8 in. timbers, against which the diagonal bracing butts. The frames are sheathed on the outside by white pine planking, tongued and grooved, the joints of which are caulked and pitched. The completed pontoons had two coats of tar.

Each pontoon is secured to the two posts of a side between four clamp sockets, from which 1 1/2 in. rods

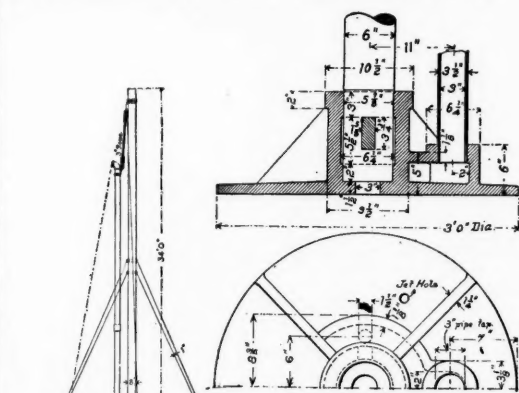


Fig. 3—Sectional Elevation and Half Plan of Disk, Pile and Jet Pipe.

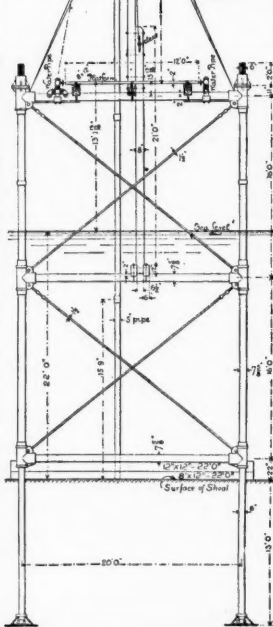


Fig. 1—Elevation of Framework in Position on Shoal.

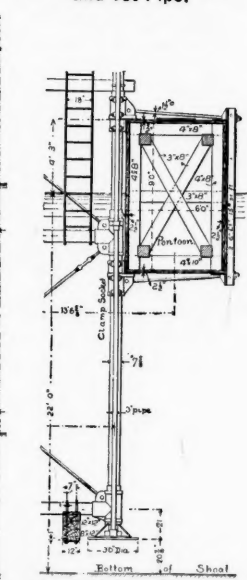


Fig. 2—Part of Structure with Pontoon Afloat over Shoal.



reach over it to two double-channel beams. Fig. 2 shows a part of the floating structure, with one pontoon clamped to it.

The skeleton was erected on a barge at the docks of the Newport News Shipbuilding Co. The pontoons were then fastened to it, and the whole apparatus, weighing 46 tons, was lifted off the barge into the water by the 100-ton shears of the company. After launching, the mast, water pipes and rubber hose were placed in position. The structure drew 21 ft. of water and had a metacentric height of 6 ft. 8 in., which proved, on the way to the site, to give ample stability.

On May 23 the apparatus was taken in tow by a steamer of the Merritt Wrecking Company, and arrived without mishap at Cape Hatteras on the 25th. The weather not being suitable, the steamer anchored two miles east of the shoal for two days. The conditions then became favorable, and at high tide the structure was towed into its previously determined position, soon striking bottom. The valves of the pontoons were opened and the latter liberated. In the meantime, the tower had been moored by the steamer, with four lines, in the center of a circle of about 650 ft. diameter. The vessel was then securely fastened alongside of the framework, ready to furnish pressure water for jetting the four piles down. Within one hour these had been successfully sunk to the contemplated depth, an underwashing by a 2-in. pipe being necessary for two of the piles, in order to get them started.

The 5-in. pipe for the borings was then washed 40 ft. into the sand. At this juncture a squall compelled the steamer to retreat to its former anchorage. The work was continued the next morning. The 3½ in. pipe was sunk 78 ft. below the surface of the shoal, and the 2-in. pipe went to a depth of 105 ft. The water was furnished at a pressure of 120 lbs. per sq. in., but this pressure had to be reduced when the two smaller pipes had been nearly driven to their required depths, for the friction of the water and sand on the outer surface of the pipes was so great that it stopped the descent by their own weights.

The borings, which were brought up in the annular space between the pipes, were caught in a canvas bag above the water's surface. They consisted mainly of fine alluvial sand. The sand is light gray and clean between the depths of 40 and 80 ft. below the surface of the shoal. It is dark gray in color, very fine, and mixed with small shells and black mud between 80 and 105 ft. When the borings were done the structure was cleared of most of its planks and timbers and abandoned.

The boring apparatus was designed and the borings were conducted by Mr. J. E. Rettig, Superintendent of Construction of the Lighthouse Board.

#### Irregular Wear of Locomotive Driving Wheels.

As most of the readers of the *Railroad Gazette* are doubtless well aware, Mr. W. H. Lewis, Master Mechanic of the Chicago, Burlington & Northern Railroad, has for several years past devoted a great deal of attention to the wear of driving tires and has taken records of the wear of tires on all engines on his line. The results of these measurements of tire wear have been given out by Mr. Lewis from time to time and have contributed largely to the available literature of this somewhat perplexing subject. We are now enabled to give in a general way some of the more recent and hitherto unpublished results in this line.

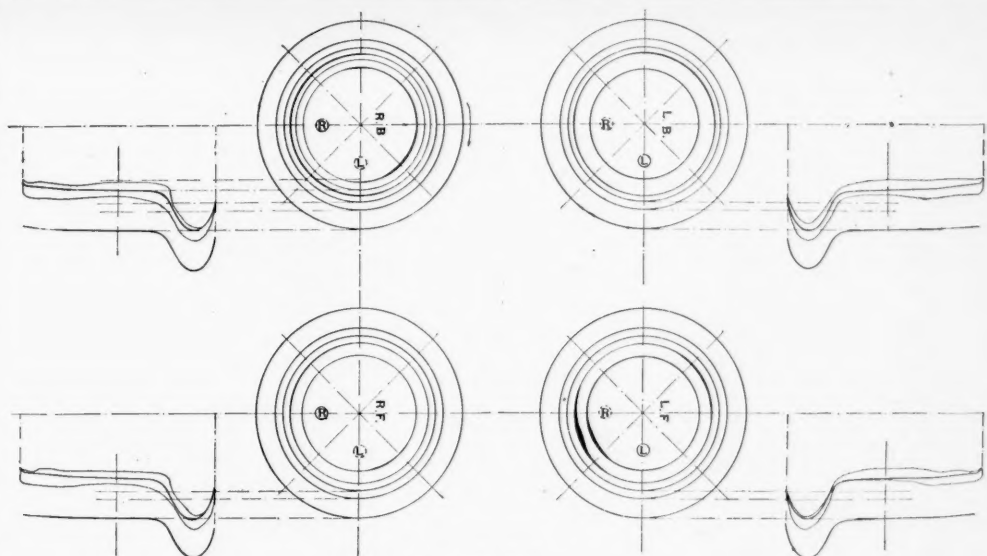
It is Mr. Lewis' practice before turning driving tire to record the thickness of each tire at the point most worn for the whole circumference of the driver by means of an instrument which will be described in a later issue.

The diagrams from this instrument give the actual depth and the extent of flat spots in radial measurements from the centre of the wheel. This circle may be considered to represent the driving wheel on a reduced scale. The variation and depth of the flat spots are shown to their full extent and positive location with reference to the centre line of crank pins. In the arrangement of these circle diagrams an engine is supposed to be standing with its right side presented and the right crank pin on the lower quarter. The left crank pin is on the forward centre, and the rotation in the direction the wheels turn when the engine is running forward, the right crank leading. The cross section diagrams are taken from the point most worn, and serve to show the actual wear between turnings.

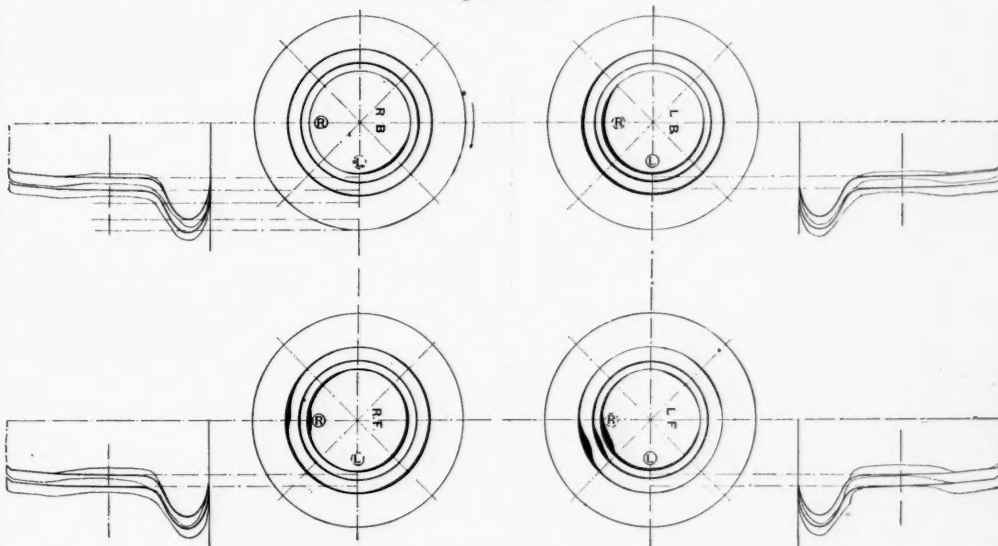
The diagrams as reproduced are on a reduced scale and the actual depth of the flat spots can not be shown. This amounts in some cases to as much as ⅜ of an inch, and as the reduction of the diagrams is the same in all cases, the relative irregularity of the wear may be directly observed. To show the irregularity more plainly, the space between the line shown by the indicator and a circle through the highest point is shown in black.

A number of diagrams taken with this device were shown by Mr. Lewis during the discussion of Mr. E. M. Herr's paper on the irregular wear of locomotive driving wheel tires before the Western Railway Club in September, 1892, and were reproduced in the *Railroad Gazette* of October 21 of the same year. The diagrams now shown are carefully selected from a large number furnished by Mr. Lewis, and may be taken as indicative of the results found under the various conditions noted below.

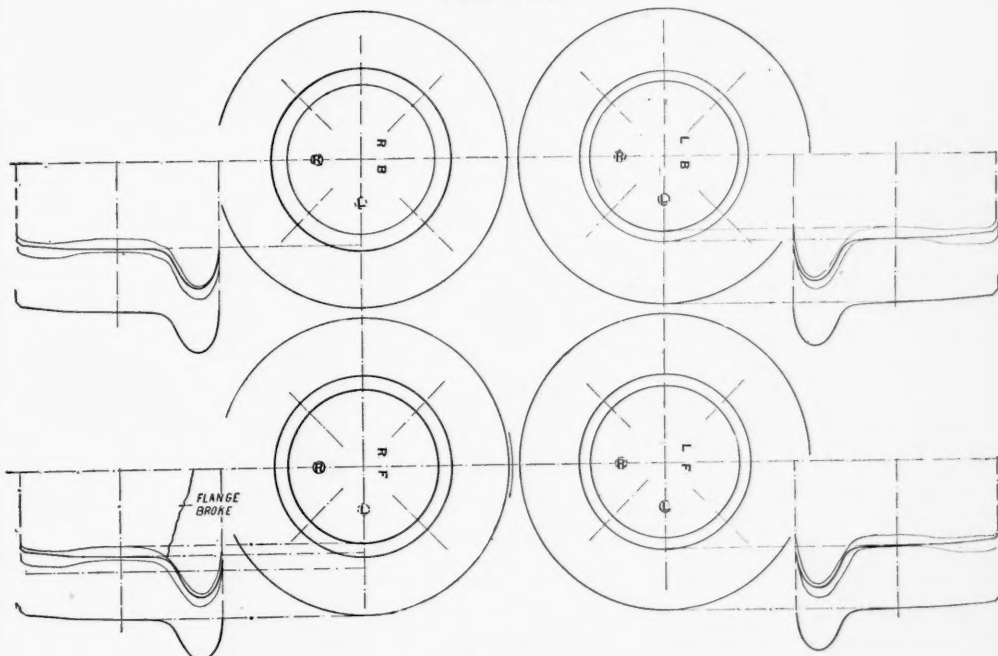
Engine Nos. 1 to 12 are passenger engines, all of the same type, Engine No. 2 alone having been run for the past four years on the hilly division between Savannah and Aurora in heavy fast passenger service, and develops a much higher rate of speed than similar engines on more



Engine No. 2.



Engine No. 11.



Engine No. 60.

level divisions. It will be seen by a reference to the diagrams of tire wear on these engines that the wear on all except the left front driver is very nearly uniform. On the left front driver the diagrams show that the flat spots found at the two last turnings begin when the crank pin is on the forward centre, the crank pin of the right side then being in its lowest position. These spots extend to about 45 degrees toward the location of the left crank pin.

The diagrams taken from Engine No. 11, which has been taken as a representative of the remaining engines of this type, show a more irregular wear. The greatest wear is at the same place and on the same driver, as shown by the records taken at three turnings. The record taken at the last turning shows a gradual wear, beginning at the end of each flat spot and extending for quite a distance around the circumference of the wheel. The right front driver also shows some wear, though to a much less extent, directly in line with the right crank pin. The wear on the left back driver is less than in either case, and is more uniformly distributed than on either of the

other drivers mentioned. The right back driver shows an irregularity at the last turning extending from the upper quarter slightly past the forward centre.

Engines Nos. 50 to 72 are American type engines, with 57-in. centres, all used in freight service, with the exception of Engine No. 60, which is running in the St. Paul suburban service. The diagram of tire wear for this engine shows a very uniform wear, there being at no point a greater variation than ⅛ of an in. in the thickness of the tire. In the case of Engine No. 70, which has been taken to represent the wear of similar engines used in freight service, the wear is very irregular, though more noticeable on the lower quarter of the left front driver. Considerable wear is shown, however, at other points of the circumference of this driver. On the three remaining drivers of this engine the flat spots can hardly be said to have a definite location, being found at almost any part of the circumference of the tires, and are possibly due to some extent to soft spots in the tires.

Engine No. 100 is a four-wheel switching engine. The diagram from this engine shows for the first turning a

very slight unevenness in the wear. In the second turning the irregularity is more marked, the drivers all being somewhat flattened, though the wear extends over nearly one-half of the circumference and is deepest at a point between the position of the right crank pin and the back centre.

Engine No. 150 is a 10-wheel freight engine, with 56-in. wheel centres. Considerable interest attaches to this diagram because of the experiments made by Mr. Lewis on the engine in relation to the effect of counterbalance and the wear of tires. In Mr. Lewis' presentation of this subject at the meeting of the Western Railway Club in April, 1890, he showed drawings illustrating the wear of the tires of this engine and gave the weights of the counterbalance. The engine then had almost the entire weight of the reciprocating parts counterbalanced, the weight being mainly in the rear and back drivers. For the purpose of experiment, 585 pounds of counterbalance were removed from the forward and back drivers, reducing the balance to that necessary to balance the rotating parts alone. The main drivers contained but 44 lbs. in excess of the weight required to balance the rotating parts. In the discussion of Mr. E. M. Herr's paper in September, 1892, Mr. Lewis presented drawings showing a record of tire wear at three turnings since changing the balance, which showed that the effect, so far as reducing the irregular wear was concerned, was imperceptible, and that the flat spots developed to the same extent and in the same location as before. On November 20, 1892, the counterbalance weight was again restored and the last turning shows the results with the counterbalance again in use. These diagrams all show a greater and more irregular wear on the left main driver, though the wear of the opposite driver is but little different. The wear on either one of these drivers is confined to no one locality, though it is more marked on the left main driver at the point in line with the right crank pin and on the right main driver at a point somewhat later in the revolution. On the forward and back drivers the wear, while not at all regular, is more uniformly distributed over the circumference of the wheel.

The diagrams on the whole seem to show that with engines running in one direction only, flat spots are liable to develop to the greatest extent at a point on the left forward driver in engines of the American type, and on the main driver in 10-wheel engines, about 75 to 90 degrees in advance of the left crank pin, and to a less extent on the same side of the opposite driver. This has been noticed already, as will be observed by a reference to the files of the *Railroad Gazette* containing the Proceedings of the Western Railway Club, in which several theories are advanced to account for it.

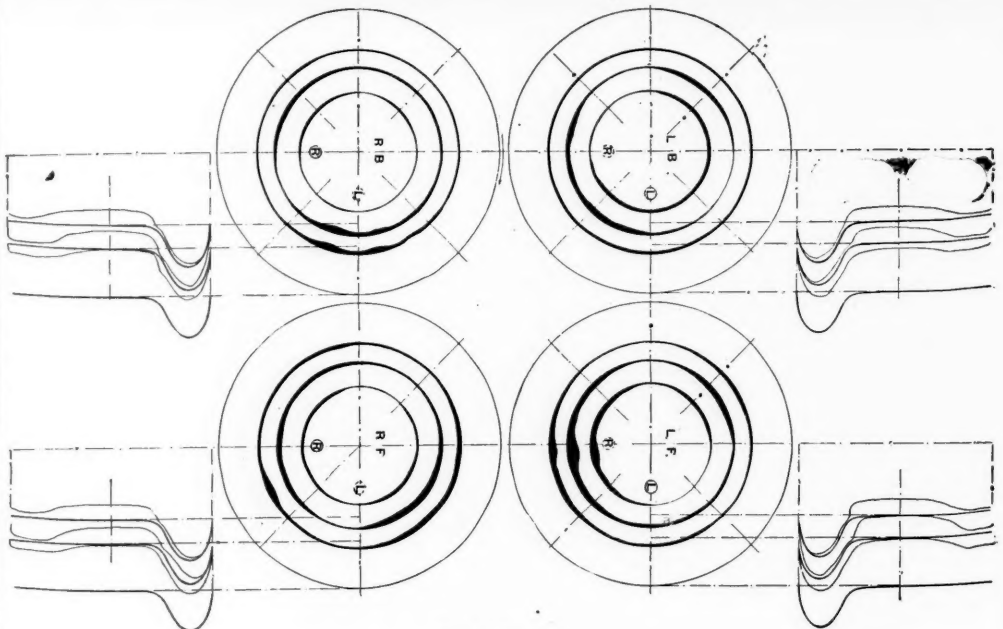
Mr. Lewis commenced his investigation with the theory that the development of flat spots was due to the effects of counterbalance, but he has now become impressed with the idea that it is to a large extent due to the slipping of the wheels from the power applied, and not from the rotative and centrifugal effect of the counterbalance, as the diagrams show that slow freight engines develop these spots to a greater extent than fast passenger engines. Experiments on Engine No. 150, already referred to, would seem to indicate that the amount of counterbalance had but little to do with the location or amount of wear.

The conclusions reached by Mr. E. M. Herr in his paper presented at the May meeting of the Western Railway Club, 1892, were that the spots are not entirely due to counterbalance, but that the greatest wear is produced when the engine is pulling hard and slips her drivers slightly at intervals while the engine moves so slowly that the amount of counterbalance can have no effect. Further wear is produced when the wheels let go entirely and spin with considerable velocity, in which case the centrifugal force of the counterbalance produces a variable pressure on the rail and causes a variable wear. In the first case the slipping is shown to occur at the point where the rotative effect due to the pressure in the cylinders is greatest. The effects of the second case of slipping are shown by the flat worn spots connecting the spots produced by the slipping due to first cause mentioned.

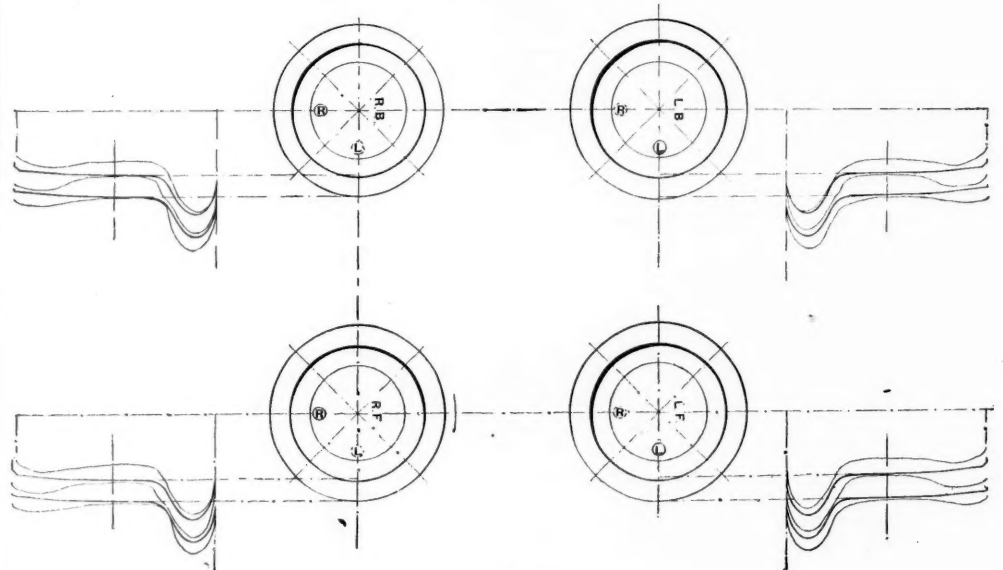
Mr. J. N. Barr, in a paper read before the Western Railway Club in January, 1891, reached the conclusion that the flat places have a tendency to group themselves where the co-efficient of slip is greatest and vary in depth with the pressure on the rail. Mr. Barr found by calculation that with an engine having 62-in. drivers, 16 by 24-in. cylinders, the full weight of reciprocating parts counterbalanced and moving at a speed of 40 miles per hour, the pressure on the rail of the two back wheels varied from 9,660 to 17,340 pounds, or 3,840 pounds above and below the static load of 13,500 pounds.

Another explanation which has been offered as to the cause of the flat spots being greater on the left side, is that it might arise from the fact that the right hand crank usually leads on American engines. With the left hand crank pin just off the centre it will be seen that the counterbalances of all four wheels are above the centre of the wheel, and that the centrifugal force of that portion of the counterbalance which is used to balance the inertia of the reciprocating parts, has in this position a tendency to lift the wheels from the rails. This reduces the weight on the rails and induces slipping, thus causing flat spots at the point of slipping.

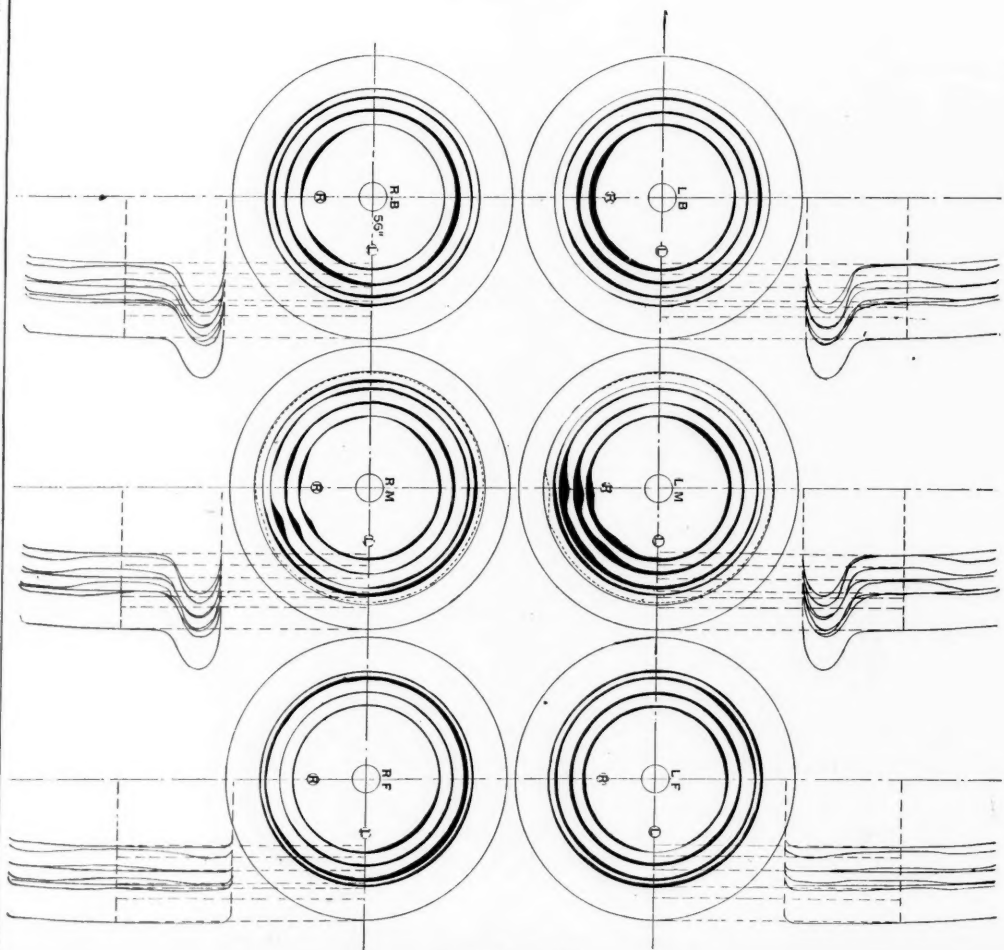
It will perhaps be difficult to determine which of these theories is the more nearly correct. The probability is that each is correct to a certain extent, and it is probable also that the angularity of the road has something to do



Engine No. 70.



Engine No. 100.



Engine No. 150.



with it. Mr. Lewis' records have developed the fact that on engines running in both directions the wear of tires is very much more regular than on engines running in one direction only. This is an important point, and throws considerable light on the subject.

Another interesting feature of Mr. Lewis' records is the mileage shown on the various engines with  $\frac{1}{16}$  in. of wear. As shown by his remarks in the discussion of Mr. Herr's paper, the mileage for  $\frac{1}{16}$  in. reduction gives a fair means of comparison for wheels of the same diameter, but it is an obviously unfair comparison for wheels with larger or smaller diameters. The below table shows the highest, lowest and average mileage per  $\frac{1}{16}$  inch reduction, and also the equated average mileage per  $\frac{1}{16}$  inch of reduction. The latter figures were obtained by adding in each case twice the thickness of the tire to the diameter of the wheel center and reducing the average mileage of each set of tires to a standard wheel diameter of 50 inches, the diameter over all of the drivers of the switching engine. It will be seen that the mileage reckoned on this basis is much less in each case than the figures generally assumed as a fair mileage for tires. The wide difference shown cannot be urged as a proof of the superiority of one brand of tires over another, as the tires showing the highest and lowest mileage happen to be of the same brand, so that the variation is doubtless due, mainly, to the conditions of service.

Engine No.	Diameter of Centers.	Mileage for $\frac{1}{16}$ in. reduction.			
		Highest.	Lowest.	Average.	Equated Average.
2	63	17,253	13,582	15,537	11,258
11	63	11,503	6,543	9,008	6,600
60	57	10,304	8,640	9,443	7,264
70	57	7,122	5,944	6,570	5,054
100	44	7,465	3,332	5,146	5,146
150	56	12,123	4,557	6,658	5,201

#### The Automatic Water Tank.

We gave recently a brief notice of a test of an automatic water tank. This system of water supply requires no steam plant or pumping engine, and does away with the services of an attendant, and its first cost is about the same as that of the ordinary water station. It therefore effects a saving of all pumping expenses, including wages, fuel and repairs to machinery. It consists essentially of a tank whose capacity shall be equal to that of the tender of a locomotive, and of steam and water connections between the tank and locomotive tender. The tank may be placed either in the well or at any place within suction distance of the source of supply.

Fig. 1 shows one arrangement of the tank and its connections placed near the bottom of a well. Fig. 2 illustrates a later and improved arrangement of the automatic tank in connection with the ordinary gravity tank now in use. To draw water, the fireman, before leaving the cab, opens a valve which admits the steam from the boiler to a pipe which conducts it to the rear end of the tender, shown in Fig. 3. He then goes to the tender, adjusts the spout over the

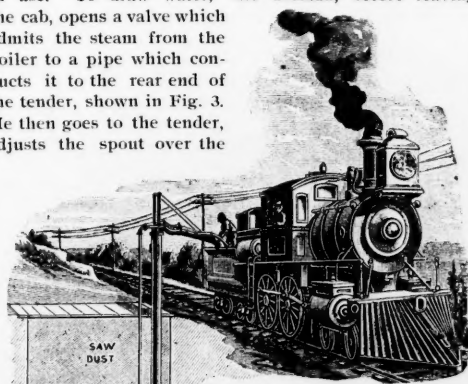


Fig. 1 Tank in Deep Well.

manhole, connects the steam pipe to a coupling, shown in Fig. 4, and then opens a globe valve which admits steam to the steam pipe. The steam is conducted by this pipe to the top of the automatic tank, which is normally full of water. The steam on entering the tank is prevented from striking the surface of the water by a deflector plate. This deflector plate takes up the impact of the steam and distributes it about the surface. The inventor claims that the steam being lighter than the air which fills the top part of the tank (amounting in all to a few cubic feet), remains at the top while the air forms a layer between it and the water, which prevents the condensation of steam. The steam pressure acting upon the surface of the water in the automatic tank forces it up through the larger pipe shown in the engraving and into the tender.

In the automatic tank erected in Brooklyn, of which

Fig. 2 is an illustration, it required 12 lbs. of steam to force the water from the tank into the tender. When the tender is full and the steam shut off, the column of water remaining in the pipe automatically opens a check valve and the water it contains flows back into the tank, condensing the steam. As the condensation of this steam goes on it tends to produce a vacuum into which the water of the well is forced by the atmospheric pressure without. It is obvious that both the steam pipe and feed pipe must close when the steam is cut off and the column of water has returned to the tank in order to have the water rise in the inlet pipe from the well. This is accomplished by two

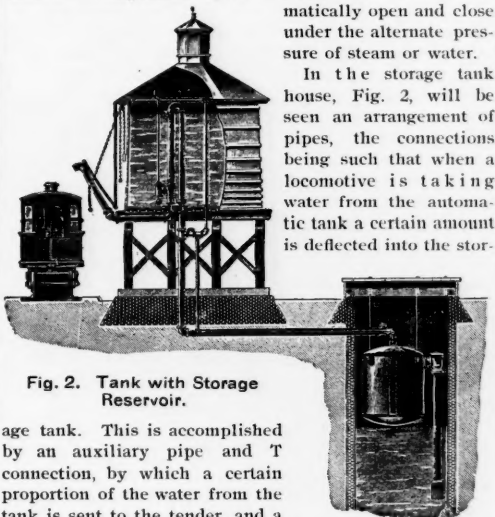


Fig. 2. Tank with Storage Reservoir.

check valves which automatically open and close under the alternate pressure of steam or water. In the storage tank house, Fig. 2, will be seen an arrangement of pipes, the connections being such that when a locomotive is taking water from the automatic tank a certain amount is deflected into the storage tank. This is accomplished by an auxiliary pipe and T connection, by which a certain proportion of the water from the tank is sent to the tender, and a certain small proportion (perhaps 10 or 15 per cent.) is delivered to the gravity storage tank. This affords a reserve supply of water to be used in case the locomotive is not steaming well or in case of repairs to the automatic tank. The illustration shows an application proposed by the manufacturers to existing storage tanks as they are now built along the line.

To conserve this reserve supply it is proposed to make it somewhat difficult for the engine men to draw water from it. To this end they have hung the chain which opens the valve for the storage supply beyond the reach of the fireman, but where he can reach it with his fire hook.

If the steam is not turned off when the supply of the automatic tank has been exhausted, no harm can come to the apparatus, the escape of steam to the tender being a prompt reminder of the circumstance. When the gravity

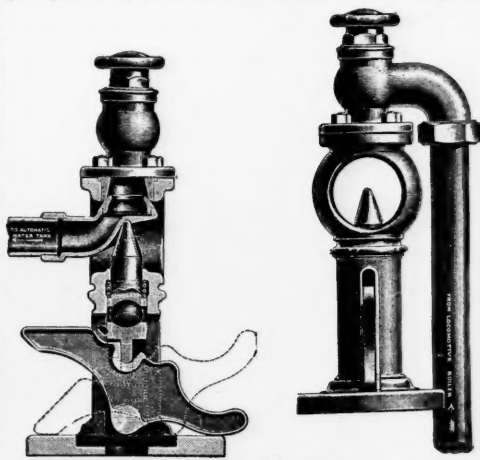


Fig. 4. Steam Coupling.

storage tank is full of water an automatic arrangement prevents the delivery of any more in operating the automatic tank.

All the connections, both for water and steam, are metallic. Fig. 3 shows connections of steam between the dome of the locomotive and the tender, and Fig. 4 shows a steam coupling employed to connect the steam pipe of the automatic tank with the steam supply from the engine. As will be noted, this consists of a pivot-like projection, which forces a hollow brass valve against a smooth valve seat above. The cross section shows a lever upon which the fireman stands, and which is part of a rocker that forces the pivot up against the ball-bearing surfaces

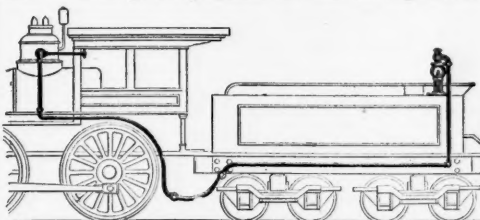


Fig. 3. Showing Steam Connections.

and forms a perfectly tight steam joint. The steam is admitted as shown, to the top of the valve, and then descends through the valve and passes through the piping into the automatic water tank.

The tank shown in Fig. 2 has a capacity of 3,000 gal-

lons, and it was discharged into the tender of a Pennsylvania locomotive in three minutes. The tank refilled under atmospheric pressure in one minute.

This system is supplied by The Automatic Water Tank Co., 143 Liberty street, New York.

#### Railroad Telegraph Superintendents' Convention.

The annual meeting of the Association of Railroad Telegraph Superintendents was held at Detroit, Mich., on June 13. President U. J. Fry introduced Mr. Geo. W. Balch, a prominent citizen of Detroit, who made a few appropriate remarks, paying a tribute to the high character of the telegraph superintendents of railroads. Secretary P. W. Drew replied to Mr. Balch's address in a few words, after which a telegram was read from the Train Dispatcher's Convention, in session at Chicago, announcing that all protective clauses in the constitution of that organization had been abolished. These clauses embraced the strike features of that organization. The first business was the report of the Committee on Standard Rules for the Government of Operators. It consisted of 51 rules, each of which was discussed by itself, and after a few slight amendments the code was adopted.

On Thursday the meeting proceeded to the election of officers for the ensuing year, with the following result: President, O. C. Greene (Northern Pacific), St. Paul; Vice-President, E. R. Adams (Philadelphia & Reading), Reading, Pa.; Secretary, P. W. Drew, of the Wisconsin Central.

The first paper was on "Machine Currents and Railroad Telegraph Lines," by J. W. Lattig, of the Lehigh Valley. Mr. Lattig gave a historical sketch of the introduction of dynamo currents for telegraph purposes. This was in the Summer of 1880, when the Western Union put a plant in its building in New York. The idea was first suggested, however, by Stephen D. Field, who was then in California. The first dynamo plant put in by the Western Union displaced 45,000 cells of battery, effecting a saving of 15,000 square feet of room. The present installation of this company, in New York, is a complete one, supplying current for all main and local wires. To operate the 1,100 main lines running out of the building at the present time would require no less than 100,000 cells of battery, and a space of 25,000 square feet.

There are 1,000 sounders in use in the office, and all are worked by dynamo current. There are 53 machines in use now, generating currents varying from 45 to 350 volts, the maximum number of lines operated from one machine being 300. Wires are grouped according to their resistances, artificial resistance being used in some cases to bring the resistance of the wires within the limit. Incandescent lamps, of special make, are used on the switchboards, affording a visible and continuous indication of the strength of current going out to the lines. These lamps are rated to give a certain illumination for the normal current. Should a "short circuit" occur on a wire the filament becomes at once more brilliantly illuminated, thus immediately indicating to the chief operator the existence of trouble. The Western Union and Postal Companies are putting dynamo plants in all their large offices.

Mr. Lattig advocated the use of dynamo currents on railroad lines generally, and mentioned the success the Philadelphia & Reading and Lehigh Valley roads are having with such currents. These currents are generated by direct current transformers, or motor-dynamos. A motor-dynamo is, as its name implies, a combination of a motor and dynamo. The armature has two windings—one for the motor and the other for the dynamo. An ordinary incandescent light current is used to drive the motor, and an independent current of the proper volume is generated in the dynamo windings, and taken off to the wires in the usual way. In many places where alternating currents are available such currents might be utilized for driving the motor, but as yet, Mr. Lattig said, a satisfactory motor of this class, of small power, had not been devised. Direct current transformers, such as are used in the Terminal station at Philadelphia, cost, complete, \$200, and each machine effects a saving of \$10 a month in zinc and jars alone.

Mr. Lattig described a dynamo plant he installed at South Bethlehem on his line. He put in two machines, which are driven by two 24-inch Backus water motors. This plant feeds eight wires, and is giving excellent results. The use of water pressure regulators insures the dynamos running at constant speed. Such a plant cost \$285 per unit, and so satisfactory has been the work of these combined machines that a similar plant is to be installed at another point on the road.

In the discussion, Mr. E. R. Adams (P. & R.) said that the Terminal station plant had been running continuously without a stop, since November 1 last, without any attention whatever, save an occasional wiping and oiling. The current was even at all times, and no trouble of any sort had been experienced. Speaking of storage batteries for sounders Mr. Adams thought they were not as economical for a large number of instruments as was the direct generating machine.

The next paper read was one by A. R. Swift, of the Chicago, Rock Island & Pacific, on "Strikes," followed by one from Mr. R. J. M. Danley, on "Protection of Railroad Crossing by Electric Bells." The author devoted himself chiefly to a statement of the requirements of this service. The alarm should be given when the train approaches within not less than  $\frac{1}{4}$  of a mile, though where all trains are slow, half a mile is far enough.



More than a minute should not elapse before the trains arrive, because if the alarm sounds too long, people will get into the habit of taking chances. Bells should be operated by wire circuit where conditions are favorable. If there are cinders in the ballast or the road is muddy the conditions are unfavorable. Where an electric railroad is crossed the track circuit must be run overhead or in insulated wires underground. The rails must be perfectly bonded so as to reduce the resistance to a minimum. When working through the rails, a closed circuit should be used so that an interruption would be made known by the continuous ringing of the bell. With a good rail circuit and stone or gravel ballast two cells of gravity battery should be used, and a 10-ohm relay. If there is any escape, only one cell of battery should be used and a relay of much lower resistance. Gravity batteries should be renewed once a month. Double track should be protected both ways the same as a single track road, to provide for emergencies when the road is used as a single track.

This paper was followed by one by Mr. A. R. Lingafelt, entitled "The Universal Inefficiency of the Ordinary Telegraph Operator to Properly Test and Locate Wire Trouble." Mr. Lattig, in the discussion, referred to the method adopted by the Lehigh Valley in training its operators in a knowledge of such matters. A general inspector is regularly employed who visits all the offices on the road and instructs the operators regarding instruments and wires.

Mr. C. Selden (B. & O.) then read a paper on "The Telephone and the Railroad." Mr. Selden referred to the disappearance from use of the Morse register, and said: If you should ask a railroad officer, whether in his opinion he could depend upon the telephone instead of the telegraph, he will promptly answer "no;" and when you ask him why, he will say "because you have no record." But as a matter of fact there is telegraphically no record in the Morse system. There is no record between what transpires at the hands of the sending operator and at the ear of the receiving operator. I believe it is as safe under proper rules and restrictions to move trains by telephone, as it is to do so by telegraph. When a party writes out a message to be transmitted by telephone, and the operator transmits by word of mouth, and the receiver indites it and delivers it, there is as full and complete a record as exists with any Morse telegram. Mr. Selden then gives the conversation that would likely ensue at both ends in an effort to transmit and receive a difficult message, and afterward explains that he would send the same message by uttering every letter in it, thus spelling out the words precisely as would be done in transmitting by Morse telegraph. By pursuing this course, the receiver is not at all hurried. He can easily keep up with the sender and even novices may do excellent work, so far as speed is concerned. The general manager, with good telephonic communication to his general superintendents, can, in five minutes' conversation every morning with each one, get not only the whole situation but all the minor details which now frequently take hours in their transmission by telegraph. The recent expiration of an important telephone patent brings this subject closer to the railroads than before.

An interesting discussion followed the reading of this paper. Mr. H. G. Bates, of the Long Distance Telephone Company, stated that the Pennsylvania Railroad Company was an extensive user of long distance telephones for the transaction of executive business between headquarters and the principal points on the line. Mr. Lattig stated that the telephone was extensively used on the Lehigh Valley. He believed that the New York Central had all its offices between New York and Albany equipped with telephones. Mr. Fry asserted that the long distance telephone service was valuable to a railroad company in the saving of time.

At the evening session on Thursday Mr. Ralph W. Pope described the Kinsman block system, which has already been fully described in the *Railroad Gazette*. Montreal was decided on as the place and June 14 as the date for the next meeting.

A paper was then read by Mr. M. B. Leonard, of the Chesapeake & Ohio, on "Lighting Railroad Trains by Electricity." He described the various systems that have been tried and those still in use, giving figures showing the comparative cost of each. He described the Lewis system, which has been tried on a car of the C. & O. He believed this had solved the problem of economical lighting, while it was at the same time extremely efficient.

"Magneto Telephones" was the subject of a few remarks made by Mr. Fry. He described a telephone system devised by himself and used on his road. He uses three wires between the instruments. All of the magneto call-bells are on one wire, which is cut out of circuit when conversation is to be carried on, the talking being done over the other two wires. The object of this method is to eliminate the resistance of the magneto calls when conversation is being carried on.

The next paper read was one by L. S. Wells, of the Long Island Railroad, entitled "Manner in Which Buildings Should be Protected Against Lightning," and this was followed by one of a very similar character by Geo. L. Lang. It was entitled "Fuse Wires as Protectors."

President-elect Greene then announced the appointment of the following committees: On Arrangements and Exhibits, Messrs. Fortune, Magiff and Lang. On Topics, Messrs. Kinsman, Lattig and Ryder.

There were about 30 members present, some of them accompanied by their wives. Excursions were made to several points of interest in the vicinity of Detroit on

Wednesday and Thursday, including one to the St. Clair tunnel, from which the return trip was made by boat. The local arrangements were under the charge of Mr. J. W. Fortune, of the Grand Trunk, and Mr. E. E. Torrey, of the Michigan Central, who were praised on all hands.

#### EXHIBITS.

Electric Selector & Signal Co., 45 Broadway, New York. A transmitter, in connection with the telegraph instrument which was placed in the room for the convenience of the members. The transmitter was connected with Mt. Clemens and Milwaukee Junction.

The Strawger Automatic Telephone Exchange, 947 The Rookery, Chicago, had four telephone instruments placed in different parts of the room; also a 100-wire exchange. By pressing a button on any one instrument any one of the other three could be communicated with at will, the operation of the selection of the individual circuits being witnessed on the switch-board or exchange in the room. Messrs. Selden and Keith explained the details of the system.

Mr. Charles Selden exhibited a Selden & Riley highway crossing signal. Over 100 of these are in use on the Baltimore & Ohio, and one at Philadelphia has operated 700,000 times without a failure.

Mr. W. S. Logue was present in the interests of the Edison phonograph, which is in regular use between Detroit and Port Huron, on the Grand Trunk, a distance of 66 miles.

#### The Master Mechanics' Convention.

The 27th annual convention of the American Railway Master Mechanics' Association was called to order at Saratoga at 10 o'clock Monday morning. It had been expected that Mr. Depew would be present to deliver an address, but he telegraphed that he was detained by a severe cold, but hoped that he might come on Wednesday.

Judge Lester, of Saratoga, made a short address of welcome which was followed by the annual address of President Hickey.

#### PRESIDENT'S ADDRESS.

In glancing over the methods of economy, which have come to be all important in railroad work, Mr. Hickey spoke of fuel as being the one item in which the greatest saving is possible, and in this direction the most important move yet taken is the introduction of the compound locomotive. He then spoke briefly of his own experience with the compound, the record of which shows a net gain of not less than 18 per cent., and he strongly urged rational trials in this direction.

After considering other possibilities in economy, especially in improved shop practice, and speaking of the growing importance of the railroad clubs, President Hickey touched upon the question of amalgamation of the Master Car Builders' and Master Mechanics' Associations, a proposition which seems to him as possibly a wise one. It would economize time in the saving of routine work, and would enable the work of the convention to be done in five consecutive days. This, in turn, would allow many people to attend who cannot now attend. It would probably increase the membership of the associations and thus add to the interest and efficiency of their work.

He spoke in a very liberal way of the desirability of co-operation between the associations and some of the institutions of learning in investigations and tests. Altogether, the address was a singularly sensible and straightforward document.

After the call of the roll the reports of the Secretary and Treasurer were read and received. The present membership is 587. The collections for the year were \$3,192.50. Three scholars are enjoying the benefit of the association scholarship at Stevens Institute. These are Hodgman, Cromwell and Ennis, all sons of members of the Association. The Secretary reported his efforts to raise \$5,000 for conducting tests of locomotives at Purdue University. The sum of the whole thing is that the business depression prevented the possibility of raising the money. The Treasurer's report showed a balance of \$361 on hand.

Mr. Henderson presented a resolution to the effect that as the Browne & Sharpe micrometer gage was adopted as the standard for the measurement of sheet metal, and as it is evident that the old method of ordering sheet metal, tubing and wire, by various and indefinite gages is still practiced, a committee be appointed to consider the question in all its bearings, and to submit at the next annual meeting a method for ordering such material by the decimal system. This was referred to the Committee on Subjects for next year.

On motion of Mr. Forney it was voted to hold a "compound experience meeting" at the noon hour of Tuesday. The report on the cracking of back tube sheets was then taken up.

#### CRACKING OF TUBE SHEETS.

The committee on this subject consists of Messrs. Purves, Boon, Blackall, Brown and Pomeroy. The replies to the circular of the Committee give what is called "overwhelming and well nigh universal testimony" that radial stay boilers carrying high pressure are more subject to cracked tube sheets than other types; this for the reason that cracking is due to too rigid staying of the crown sheet adjacent to the flue sheet and flange, and to placing flue holes too close to flanges and possibly some of the difficulty is chargeable to high steam pressures carried. The principle involved in curing the difficulty is provision for so staying the front end of crown sheet as to give requisite support with sufficient flexibility. A number of engravings are given, showing the means suggested by various members for doing this.

Mr. Mitchell, discussing the report, says that he has a large number of wagon top engines, and that very few

cases of cracked tube sheets occur except in bad water districts. He does not know that he has any except in those districts.

Mr. Vaulain: Of what use is the radial stay if it does not hold something? We are told that the first two rows of stays should have lost motion enough to allow the tube sheet to rise or expand, but when that sheet is expanded, the stays are loose and what holds the crown sheet? The trouble with cracked tube sheets is not due to the staying, but to other causes. The trouble is with bad water and lack of attention. Trouble also comes from the water space being too small between the tubes; too many tubes in the boiler. His cure is to take out some of the tubes. There is no use of them if there is not water around them to heat. Increase the water space and better results will follow, not only in the life of the boiler, but in the fuel consumption.

Mr. O'Connell, whose experience is in bad water districts cannot get on with radial stay boilers, but has no trouble with crown bars, and Mr. Galbraith confirms Mr. O'Connell's experience.

Mr. Roberts agreed with the report of the Committee. He has considerable trouble with radial stay boilers on account of low water, but has no trouble with crown bar boilers, although he has had low water in them but no accident to exceed \$40 in cost of repairs. Nearly every case where water has got low in the radial stay boiler has been followed by destruction of the locomotive with a wreck and perhaps loss of life.

Mr. Peck, on the contrary, has 34 radial stay boilers which have been in service twelve years. There has been no cracking of crown sheets in that time. He has had several cases of cracking between flues and the lower part of the furnace where the flue sheet and throat sheet are in one piece.

Mr. Pitkin asked if this cracking does not take place as the boiler is fired up and the plate heated, the heat not being transmitted rapidly to the water. He believes that firebox plates are heated to such an extent as to raise the crown and if they are held rigid something must give way. The flue sheet being the weakest place cracks. He never knew of any difficulty of this kind with straight boilers.

Mr. Purves said the report covered wagon top boilers only.

Mr. Brown has tried both crown bar and radial stays for the last ten years; has used nothing but radial stays and there is no use in saying that they are not good boilers.

Mr. Setchell has twelve straight boilers with radial stays which have been in regular passenger service for ten years with no difficulty whatever. He believes in radial stay boilers which give general circulation and better steaming than crown bar boilers, and he thinks the Association had better set about getting at the real trouble with the radial stay boiler, if it exists.

Mr. Gibbs has lately noticed something which tends to corroborate the report. Expanding the flue sheet in heating up causes it to rise while the shell does not rise. It is reasonable to suppose that the firebox expands in every direction, and he has noticed cases where the stays placed close to the side sheets would apparently be shoved through the sheets, and the stays a little distance away were all right. His rule is not to put in stay bolts close to flat surfaces either up or down or fore and aft.

Mr. Barnes said in the past ten years we have been increasing the intensity of the fires very much, and if that goes on the time will come when you may heat the sheet so hot that the water will not stand on it. There is one reason why the flue sheet should be hotter than any other; it is thicker, and the tubes are comparatively close together on the back side of the sheet. The steam forms larger bubbles there and gets more nearly its spherical state, and when the fire gets beyond a certain heat the water will float above the metal as we sometimes see when water is spilled on the top of a hot stove. There should be no difference in the cracking of tube sheets in wagon top or straight top boilers.

Mr. Wells has not had much practical experience with locomotive boilers for some years past. He thinks the radial stay is as good as any other, provided the crown is protected from going down in case it becomes overheated from low water. When it becomes overheated, if the stays are headed on the under side, the sheet will come down and most likely take the firebox with it. He examined a radial stay boiler a few years ago where the stay bolts were broken in the side sheets to the number of 15 or 16 in one place. This sheet gave way and came over from the right to the left side, carrying off the heads of crown bolts in two rows, but from the third row over to the other side they remained secure and the result was that the sheet did not go out of the firebox. It tore off all the stay bolts in it, and yet the crown bolts held up the crown except the two rows mentioned. If this had been a crown bar boiler the crown sheet would, as a matter of course, gone down.

He thinks the Belpaire boiler is the strongest boiler used. He began using it fifteen years ago, and up to the time he quit railroading there had never been any considerable experience with the cracking of the flue sheets. He thinks the Belpaire boiler and radial stay boiler are stronger and more secure than crown bar boilers. If the flue sheets crack at the flange that can be overcome by a mechanical arrangement. The difficulties mentioned of cracking between the tubes are just what has occurred ever since locomotives have been used. In the fifties when wood fuel was used there was more trouble with cracked tube sheets than now. It was a common thing to find cracks between the tube holes, particularly in the upper corners, and the practice was to drill a hole at the crack and screw



a plug in, and in that way they would run sometimes a year or two longer. The difficulty comes, he thinks, from the repeated rolling out of tubes; the metal is stretched and the flange of the tube sheet is finally crowded or raised upward from its original position. The crown sheet should be allowed to go with it.

Mr. McIntosh attributed the expansion to the fact that the circulation is slow in starting. Sling stays will help; filling your boilers with hot water will also help. Radial stays placed a proper distance apart and properly secured will sustain the crown sheet as well as crown bars.

Mr. Barnett finds that the straighter the top of the inside firebox the less trouble you will have at the joint of the firebox, where the tube sheet and crown sheet come together.

Mr. Forsyth said the flat crown sheet as a remedy for cracked tube sheets cannot be sustained by good reasons. The committee has stated the cause of the trouble and given a good remedy. The cause is too rigid staying of the tube sheet, and the remedy proposed is a rational one—simply to move the stay further away from the tube sheet and give it some flexibility.

The meeting then adjourned until 9 o'clock Tuesday morning.

On Tuesday morning the discussion on Radial Stay Boilers was resumed.

Mr. Johann said that, after very considerable attention and much experience, he concludes that the radial stay boiler is decidedly preferable to crown bars. In 1879 he presented drawing of a radial stay boiler; that boiler is still in service, after more than 14 years, and in good order.

Mr. William Smith had not had large experience with radial stays, but has seen all the defects in crown bar boilers that are spoken of with the radial stays, except cracking of the flange in the flue sheet at the top. There is one good reason why sling stays should be used in front—expansion does not set in there until after the steam commences to rise. A splash board, or the like, should be used with radial stays, to stop the wash of the water forward. In a quick stop and water rather low, the sheet may be uncovered for a few seconds, and then something suffers. A couple of crown bars in front will serve the purpose.

Mr. Henderson had noticed this trouble with a straight boiler. With radial stay and the wagon top he did not have so much of this trouble. The greater length in the wagon top seems to provide the slasher. Here the discussion was closed, on motion.

The report on Oiling Devices was next taken up.

#### OILING DEVICES FOR LONG RUNS.

The Committee on this subject consisted of Messrs. Barnett, Campbell, Stevens, West, Smart and Baker. Considerable information was collected from England, as well as from the United States. The English practice is marked by the use of reservoirs at high level, that can be filled while the engine is running. Mr. Aspinall, of the Lancashire & Yorkshire, originally followed this practice, but for axle box lubrication he now uses a large chamber on the crown of the axle box. This is provided with a spring oiling pad. Mr. Ivatt, Great Southern & Western of Ireland, also considers high-level reservoirs with long tail pipes as a mistake. A very little oil will run any bearing 144 miles, if properly applied. Mr. Rhodes, of the C. B. & O., uses a three-pocket, high-level reservoir in cab for each journal of the rear axle of Moguls, and, in addition to such reservoirs and tail pipes, one running board level. Mr. Barnum, of the Union Pacific, and Mr. Stevens, of the Lake Shore, equip their passenger engines with hose, so that water may be played on any axle or tender. Mr. Paxson, of the Reading, is the only one who gives any information as to the use of Corey's Force Feed Lubricator (see *Railroad Gazette*, of January 5, 1894). The use of this for a year on a compound shows about 25 per cent. saving. He uses it to deliver oil to all axle boxes, eccentrics and lengths.

Mr. Stevens, Lake Shore, used oiling pipes from the foot-board to all axle journals on the locomotives drawing the Exposition Flyer, 135 miles continuous run, and the entire service of those trains was performed without a single hot box, and the oil used per unit of service did not show a marked increase. Mr. Mitchell, of the Erie, having a run of 140 miles, used a large special fount above the frame for each journal, with a threaded spindle feed. The feed is set when the engine starts and not shut off until the end of the run.

Other examples of special practice are mentioned, and a number of drawings are referred to, but we have received no proofs of these drawings. The report is a very good one, clearly written, and will doubtless be carefully read as a whole.

The Committee says the most notable point in the replies as to oil cups is the growing practice of forging them solid with all rods. Little attention seems to have been given to eccentric cooling. In brief, the replies and drawings show that modern practice for high-speed lubrication is to deliver a small amount of oil continuously over the whole length of bearing surfaces; bearing surfaces are made larger; it is not judicious to trust to one oil hole where two are possible; cups or oil pockets are solid, rather than separate; grooves are liberal in number and size; the cheapest oil is then admissible; strainers and covers over all oil pockets are desirable.

Mr. Barnett gave some additional information, and Mr. Mitchell stated that since communicating with the Committee he had abandoned the special founts, and lubri-

cates successfully from the present journal box; he will not use the three-recess journal box further.

On motion of Mr. George Gibbs, the order was suspended to take up the report on Boiler Steel Specifications. The discussion on this, being long and important, will be omitted until our next issue.

#### COMPOUND LOCOMOTIVES.

The topical discussion on the Compound Engine was next taken up.

Mr. Garstang spoke of the Richmond compound now running on the "Big Four," and, without specific data, he can say that there is a marked saving in fuel, and the company has not had to spend a cent on the special mechanism connected with compounds.

Mr. Vauclain says that the ratio of economy is holding its own. Since the last convention, the Baldwin Works have made some useful improvements in detail; the cavity of the valve leading from the high pressure to the low pressure cylinder has been enlarged, with good results; the cylinder cock, which is a horrible example of what can be done if a man starts out to invent something, has been done away with almost entirely (see the last issue of the *Railroad Gazette*). These engines are running now the fastest trains in the United States, between Camden and Atlantic City. Several Baldwin compounds are running with 200 lbs. steam pressure, and give better results than with lower pressure.

At this point Mr. Forney submitted some comparative figures, obtained from Mr. Buchanan, as to experience on the London & North Western with the "Greater Britain" compound, and on the New York Central with simple engines. As we have not received these figures we will hold the discussion of them until they can be published.

Mr. Lauder thinks the experience of the past year has developed some doubt as to the advantages of the compound; but he believes that a compound locomotive will be built that will give as good service as the simple engine, with valuable fuel economy. But it will have to be an engine that can be kept in first-rate condition.

Mr. Morris believes that such an engine is now running. From his experience on the C. & O. with the Richmond compound for two years, he thinks this is true. That engine has made 14 per cent. greater mileage than the average of the ten simple engines run with it. The repairs were but 80 per cent. of the average of the ten simple engines; the oil and waste were 92 per cent.; the fuel consumed was 84 per cent.; the total expenses were 94 per cent., and the cost per mile run, 83 per cent. The days in shop were 5, as against an average of ten for the simple. The engine crews speak well of the machine, and the firemen prefer it, as it uses less coal. The engine has not been in the shop for repairs to the compound feature.

Mr. Medway had realized a saving of 24 per cent. with a compound engine at first, but later this disappeared, and for six months, ending last September, he found 50 per cent. more mileage with a simple engine, 14 per cent. more miles per ton of coal with the compound, but over twice the cost per mile with repairs with the compound. He does not state, however, what engine he has used, or how much or how large its experience has been.

Mr. Mitchell had used compounds with the hope of saving water, which would be advantageous in several ways, particularly by avoiding bad water. They have been run in fast freight service. He finds a saving in coal, no greater repairs, and the engineers prefer them. He fully endorses the Baldwin compound as more economical than the simple. He has 15 in service, six of which are decapods.

#### EXHIBITS AT THE SARATOGA CONVENTIONS.

We gave last week a list of the exhibits then in place. Since that time some of those which pertained more especially to the construction and decoration of cars have been removed, and their places filled by other exhibits. Among the later arrivals are the following:

The Winona Manufacturing Co., Winona, Minn.: The McIntosh improved automatic oil cellar and sight feed oil cup, for use on locomotive trucks.

The American Steel Casting Co., Sharon, Pa.: Several trucks and truck frames fitted with the American steel bolster, both with rigid and giving side bearings. Upon two of these trucks are mounted samples of a new design of steel body bolster. This company also exhibits the Central steel draft gear, a new form of draft sill, intended for use with the American continuous drawbar.

The Morton Safety-Heating Co., Baltimore, Md.: A model showing the design and application of their system of heating railroad and street cars by stored heat.

The Boies Steel Wheel Co., Scranton, Pa.: Sections of integral-lock, forged wrought-iron center. No. 2, steel tired wheel, and steel-tired wheel with retaining ring.

Jas. L. Howard & Co., Hartford, Conn.: Latest oil lamp for passenger cars; also photographs of various car fittings which they manufacture and blue prints of new railroad car flushing water closet.

Babcock & Doolittle, Binghamton, N. Y.: Samples of their parlor city flue cleaner, for locomotive and stationary boilers.

The Ajax Metal Co., Philadelphia, Pa.: Bearing metal, both in bars and applied to bearings of various forms.

The Utica Extension Car Step Co., Utica, N. Y.: Models of their device as applied on several roads to car steps.

The Detrick & Harvey Machine Co., Baltimore, Md.: A model of their bolt tapping and threading machine.

Columbian Metallic Rod-Packing Co., Philadelphia, Pa.: Samples of their piston and valve-rod packing.

The Standard Oil Fuel Burner Co., Fort Plain, N. Y.: full size models, showing the construction and application of their burners.

The Coale Muffler & Safety Valve Co., Baltimore, Md.: A number of specialties, including pop safety valves, relief

valves and combined anti-compression and vacuum; also several patterns of quick-opening valves and new locomotive blow-off cork.

The Association of American Inventors, Philadelphia, Pa.: A collection of models of railroad appliances, among which are rail joints, nut locks, couplers and various other articles.

The Brussels Tapestry Co., Chauncey, N. J.: Improved car window.

The Coburn Trolley Track Co., Holyoke, Mass.: A full size model of a car door hung with their attachments.

Peter McKenzie, Montreal, Canada: A new frictional car window fastening device.

The Magnolia Anti-Friction Metal Co., New York: Samples of bearing metal.

S. Vessot & Co., Joliet, P. Q.: Sample of car axle lubricator. This device is shown in operation, a journal to which it is applied being driven from a counter shaft.

The Weeks Automatic Car Coupling Co., Hobart, N. Y.: A model of automatic car coupler.

The Tyler Tube & Pipe Co., Washington, Pa.: New York office, 39 Cortlandt street: Samples of "Diamond T" and Algerite charcoal iron boiler tubes, which are twisted, bent, expanded, swaged, and cold drawn into various shapes to show the ductility, "life," expansibility and purity of the iron which they manufacture. This company own their mines, bloomery, rolling mills, skelp and tube mills, and are in a position to know precisely what they offer for sale. This iron is used exclusively on the Manhattan Elevated Railroad and numerous other roads as well as by the Babcock & Wilcox Co., in their water tube boilers.

The Dreher Manufacturing Co., New York: Journal boxes, fitted with patent axle box flooring.

The U. S. Bronze Co., Cleveland, O.: Bearing metals, adapted for car journal bearings, street railroad motors, etc.

The Westinghouse Air-Brake Co., Pittsburg, Pa.: A  $\frac{3}{4}$ -inch air pump and reservoir, which are used to supply air to various exhibits, and also, in connection with the American Brake Co., an air-brake inspection machine, a device designed to facilitate the removal and replacement, for inspection or repairs, of pistons in air-brake cylinders. This arrangement is applicable to use on passenger and freight cars, and also to locomotives and tender equipment.

The Linden Steel Co., Pittsburg, Pa.: Samples of steel floor plate, used for locomotive running boards, car steps, landings, staircases and other places where a rough surface is required.

The Smillie Coupler Manufacturing Co., Newark, N. J.: Samples of double lock M. C. B. coupler.

Mr. Geo. L. Weiss, Cleveland, O.: A set of Nicholson's patent expanding lathe mandrels, the set complete consisting of nine pieces, having a range of work of from one to seven inches. He also exhibits a new device for beading boiler tubes.

The Burns Hydro-Carbon Burner Co., Fort Plain, N. Y.: Application of their burner to forges and furnaces using fuel oil.

The Henry C. Ayer & Gleason Company, Philadelphia, Pa.: exhibit samples of the Johnson self-feeding boiler tube expander—a device which within the past few years has become quite well and favorably known.

One of the enjoyable features incident to the conventions was the special train of two Wagner palace cars and three coaches, furnished to the New England Railroad Club by the Fitchburg. About 125 members and their friends accepted the courtesy of the company, through Superintendent of Car Department Marden and Superintendent of Motive Power Medway.

The entertainments given during the conventions were fully up to the usual standard and very enjoyable. One of the most pleasant features provided was a trip to Lake George on Saturday, a train of nine coaches being placed at the disposal of the party by the management of the Delaware & Hudson Canal Co. The excursionists left Saratoga at 9.30, arriving at Caldwell at the head of the lake, an hour later. Luncheon was served at Fort William Henry Hotel, and the whole establishment turned over to the guests who occupied themselves with fishing, boating, short trips, upon a small steamer, and in various other ways until the departure of the train at 4.30.

#### Demurrage Inspectors.\*

The manager must know that all cars are placed upon arrival, and not held back for any improper purposes; that the rules and regulations are fully understood and enforced by agents; that their records are properly kept, and their reports accurately made, including therein all cars handled; that correct records are given of arrival, delivery and release; and that all charges accruing are collected and remitted.

Where the territory of an association includes from 500 to 1,000 stations, inspectors should be distributed with resident headquarters at central points from which the mileage assigned can be most advantageously worked; and routes arranged with reference to train service, so as to reach home each night, so far as practicable. Much depends upon the man. That quality of human nature exemplified in the director who does not direct, and the flagman who never flags, may enter into the make-up of the average inspector, still it is, I think, entirely practicable to know pretty definitely what is going on. In our association a daily trip report is required (blank  $3\frac{1}{2} \times 8\frac{1}{2}$  inches, easily carried in the pocket), showing the hour inspector started out in the morning and reached destination at night, the stations visited and the hour at which he arrived and left each one. Space is also provided on this blank for noting the general condition of car service work at the stations inspected, the number of cars omitted since last checking (for which supplementary report is required,) and the amount of uncollected charges.

For the purposes of obtaining this information the inspector should check up the principal stations in his district as often and as thoroughly as time will permit. The general condition of the work will be noted from the manner in which the records are kept, and by observing the methods in vogue for obtaining yard reports of placing and release. The manager must know that all cars are reported and that an accurate record of detention is given. How can this point be ascertained? Not by a little talk with the agent or the car service clerk, and the acceptance of their rose-tinted assurances that everything is lovely. The inspector should see for himself, and this involves what we term "checking up" a station. In checking the smaller stations an inspector first takes the

\*"How to Obtain the Best Results from our Inspectors," a paper read by A. L. Gardner, Manager of the Baltimore & Washington Car Service Association, at the Annual Convention of the National Association of Car Service Managers, at Old Point Comfort, Va., June 19, 1894; slightly abridged.



cars in the yard and notes whether loaded or empty, and what portion of the freight is still remaining in the car; he then takes this memorandum to the office and compares with the record shown on the car service book, noting whether any cars are incorrectly reported as released before they are actually unloaded. He will then compare the record of manifests received and forwarded with the car service record book, and check this with the reports, to see that all cars coming under the rules have been reported. If the inspector has any reason to doubt the records of arrivals or release, this can be verified by the station car report made to the superintendent. If any cars have been omitted the agent is required to make up supplementary reports, and if any errors have been found in the record they are corrected at once. It is often found that this will make a difference in the amount of car service earned on such cars as have been detained over the free time, in which event the agent is instructed to make a bill for the additional amount, try to collect the same, and if he cannot (the goods having been delivered) to make application to the manager for relief.

At the large city stations where it is impracticable to compare the car service record with manifests received and forwarded, the inspector visits the yards at stated intervals for three or four successive days, noting all cars that he finds, whether loaded or empty, and what proportion of the consignment is remaining in the cars at the time. After taking the yard for four successive days, his report is turned in and is checked by the record clerks, and in case any cars are found which have not been reported, or any discrepancies discovered in the record given by the agent, he returns to the station with such statement and has the record and reports corrected accordingly.

A considerable portion of the inspector's time must be spent in traveling to and from the stations inspected. I think that this can be turned to good account and constitute a valuable adjunct to his other labors. The plan I have had in use for some time is this: The inspector carries a small pad of blanks (pocket size), on which he takes down the cars at way stations and sidings, which can easily be done on a local train. On this report is noted the hour inspected, initials and car number, contents, and the approximate proportion of lading then in car. This report is sent to the manager's office each night, and is held by the record clerk and checked against the agent's report of the cars when received. Any inaccuracies in agent's report, such as omitting the car altogether, or giving erroneous report of release, or placing thus disclosed, are immediately brought to the attention of the agent, and an explanation requested. The mere fact that cars are being looked after in this way, and the uncertainty as to when the inspector may be along, has a very salutary effect in preventing errors of this kind. Over two years' use of this report has demonstrated that it is one of the most important factors in the inspector's work.

### Timmis' Electric Semaphore for Manual Block-Signaling.

Readers of the *Railroad Gazette* are familiar with Timmis' automatic block signals as used on the Liverpool Overhead railroad. Two essential features of this apparatus are the powerful electro magnet for operating the semaphore arm, and the lever or electrical contact piece by which the rear car of a train sets each signal to danger as it is passed. Making use of these devices Mr. Timmis offers a plan for abolishing a part of the signal cabins, where the signaling (non-automatic) is done in the ordinary English way, by having the signals at a station located, say, between A and B (see diagram) operated by the man at A or B, or by both. The cut shows a typical piece of road, where three tracks are used, two up, fast and slow, and one down. The length of line between the two stations, A and B, is under the old system divided into two sections 1-3, 3-5 on the up tracks, and into four sections 6-7, 7-8, 8-9, and 9-10, on the down track, by an intermediate cabin situated near signals 3 and 8. From this cabin are worked the signals 2 and 3, the distant on 7, stop on 8 and stop on 9. From station A are worked signals 1, 10, and distant on 9; while 4, 5, 6, and outer advance on 7 are worked from B; all the operations being effected mechanically in the usual way through levers.

Mr. Timmis proposes to do away with the intermediate cabin, and work the signals marked AE and BE from A and B respectively, by means of electricity. The sections 1-3, 3-5, 6-7, 7-8, 8-9, 9-10 are still retained, and if necessary the two sections on the up tracks can be split into four, as for the down track. The electric equipment for operating the signals in this way involves no great amount of complex apparatus; at A and B are placed small electric lever frames about two feet square. The levers interlock among themselves mechanically and with the other levers at A and B. The up line electric signals are worked from B and the down line from A. All electric signals are thrown to danger automatically by the passing train, a brush contact on the last vehicle serving for the purpose as it travels over a metallic surface between the rails, completing the circuit thereby. As the signals are thus actuated by the trains, the action is repeated in both cabins, A and B. The method of moving the signal

car service charge accrues to collect before all the goods are out of the car.

The agent who desires to keep his job tries to keep the uncollected account at a minimum. With inquiries from the auditor as to why bills are not paid and other reasons, agents make a much better effort to collect car service when they are charged on their auditor's books with every dollar earned.

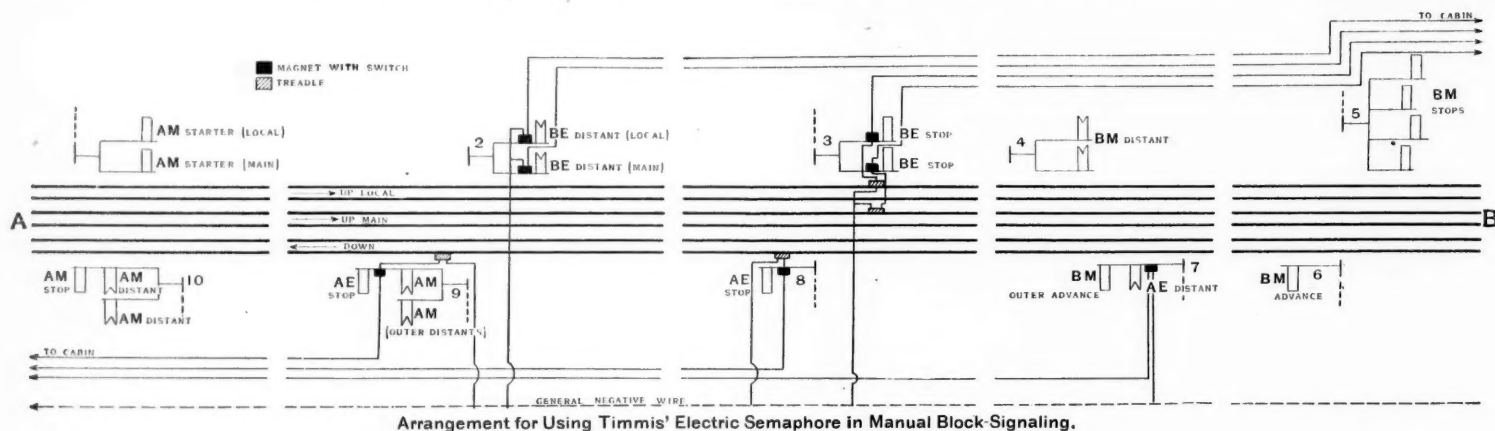
As a rule, agents not required to account to their auditor for all car service earnings are not only lax in their collections but lukewarm in their support of the rules. They see that the car service dollar is not as sharply looked after as the dollar due for freight. They reason, too, that the company is insincere in the car service agreement, because if it were in earnest surely they would sometimes hear about the rules and the necessity for collecting the revenue, from some other source than the everlasting nuisance of an interloping car service association.

Doubtless you have all been asked by agents what they were to do with the first dollar some mild-mannered consignee had paid them for car service. We have often received the dollar bill with a string through it, securely tied into the envelope, from an agent who thought us the sole party interested in this revenue. . . . On the Pennsylvania Railroad each agent makes a regular car service bill or manifest, similar in many respects to a way bill, for the amount earned on each car delayed beyond the free time. This bill goes at once to the auditor and is charged to the station issuing it. At the end of the month the car service association sends the auditor a statement showing car number, initial, date of release and amount earned on each car, which should check with the car service bills issued by the various agents during the month. All collections are remitted to the treasurer, and refunds are made only by treasurer's check drawn in favor of claimants and issued through the car service manager.

Car service rules, from their application at the hands of agents and the collection of earnings, to the accounting by auditors, are worthy of the same systematic and dignified consideration as is given other departments of a railroad.

### A New English Armoured Train.

An improved type of armoured train, constituting a new departure in English railroad enterprise and in coast line defense, was experimented with on May 19, on the London, Brighton & South Coast Railway before a distinguished company of military and railroad experts. Though the undertaking is one which may lead to results of the highest military importance, railroad men have had a great deal more to do with it than military authorities, both in its inception and execution. The armoured train was built



Arrangement for Using Timmis' Electric Semaphore in Manual Block-Signaling.

With a force of inspectors at the minimum, which all doubtless are at the present time, probably only the most important competitive stations can be checked, and the thorough use of this report will, in my judgment, furnish about all the attention that need be given to the smaller stations.

In these remarks I have endeavored to outline the principal work of the inspector. There are other services which he can and does efficiently render, both to the manager and to the agents, such as investigating particular cases requiring special information, smoothing down the rough edges of contentious shippers, and making collections where the agent has failed, or which he cannot reach; but this can usually be done in connection with his principal business. I have heard of inspectors who never look into the agents' records or the cars on track, but I cannot conceive of such work as serving any practical purpose.

I know that some agents turn a cold shoulder to the inspector, objecting to his examining their records, and looking into cars as partaking too much of the nature of the spy, and claiming that this is not done in any other department of railroad work. With this sentiment the manager has nothing to do. His responsibility and authority are clearly defined. The conditions recognized in formulating the agreements I will not at this time undertake to discuss. The wisdom of their provisions has been amply demonstrated in practice. There are no grounds for any feeling that inspection necessarily implies suspicion of wrong intent. I have always preferred to assume good faith on the part of all parties connected with the enforcement of the rules, until the contrary is proved. The object of inspection is primarily to see that the rules and regulations are properly understood and applied. This much is due both to the manager and to the associated interests he represents. In the large majority of instances checking discloses some error or inaccuracy in cars or record; if it does not, no better service could be done for the agent than to demonstrate the fact.

But whether from intention, carelessness or ignorance, the fact remains that a great many errors and discrepancies do occur, to the correction of which a great deal of labor of the manager's office must be given. Too many agents seem to regard their car service work as a secondary consideration, the last to be done and the first to be neglected. Inspectors often find that agents have not seen their rules for months, and sometimes clerks doing the work will say they have never seen them. The value of the car service regulations is, I believe, apparent to every operating officer, and while a good deal of progress has been made, I am satisfied we can render still better service if we can get more thorough work from agents, and in this our success will be measured largely by the efficiency of our inspection service.

by electro magnets was described in this journal when dealing with the Timmis automatic electric signals (see *Railroad Gazette*, April 6.)

Block instruments connect the cabins at A and B with the most advanced signals worked from B and A respectively, and if necessary also the sections from the same cabins are so connected. The cost of electric energy required for operating the signals under such conditions is stated to be not more than three cents a day.

In the cut AM indicates signals worked mechanically from A cabin; AE signals worked electrically from A cabin; BM signals worked mechanically from B cabin; BE signals worked electrically from B cabin.

### Adjustment of Demurrage Accounts with Auditing Departments.\*

In June, 1891, when the association represented by the writer was six months old, the need of a more thorough system of accounting for car service earnings was apparent, and the manager addressed a circular letter to the auditors requesting that agents be charged with all car service earnings, whether collected or otherwise disposed of.

A majority of the seventeen roads in our association are now charging agents with all earnings, requiring them to show the items of uncollected car service at the end of the month just as they are required to detail the unpaid freight bills. Where the auditing department has not adopted this method, the head of the transportation department gets from us a monthly statement of car service charges outstanding at each station. With this information he proceeds to do the work which, with a proper system of accounting, would, for the most part, be unnecessary, urging each agent to collect outstanding car service charges and keep his account cleared up. Agents charged with car service earnings can get relief from uncollected bills only by a cancellation voucher, issued by the manager through the auditing department. The reasons for each cancellation are thus on record in the office of the manager and of the auditor. If a cancellation voucher is issued to give relief from an unpaid bill due from a stubborn consignee, who, even at this late day, opposes the car service principle, and whom it is not deemed expedient to sue, it makes plain the duty of the agent dealing with the stubborn consignee, to be ready the next time a

in the workshops of the London, Brighton & South Coast Railway; it is the joint property of that company and of the 1st Sussex Artillery Volunteers, of which regiment one of the Brighton directors is honorary colonel; it was worked at its trial mainly by mechanics employed in the railway workshop, from among whom the volunteer regiment obtains a large percentage of its best artillerymen.

The train consists of an armoured gun truck and two ordinary English railroad cars armoured on the side and ends and round the roof, as cover for men firing with rifles therefrom. The gun truck is constructed to carry the 40-pounder gun of the 1st Sussex Artillery, and to allow of its being fired end on and broadside.

Its basis is one of the railroad company's 20-ton trucks with the side built up to the height of an ordinary English "wagon" by iron armour plating  $\frac{1}{2}$  in. thick, which is increased to  $\frac{3}{4}$  in. in front, where the port hole is. The rear end is open and the top roofless.

To provide for broadside firing the gun is mounted upon a turntable, which occupies the whole length of the truck, within the bullet proof plating. The turntable can be worked either by a wheel and tackle manipulated by one man, or by two handspikes fitted in the rear of the truck and easily handled by two men from outside.

To provide for the recoil the wheels of the gun run back on gradually rising metal grooves, and there is also a hydraulic cylinder which directly takes up the recoil. As an extra means of securing stability for the gun, two sliding iron girders have been incorporated in the truck, which can be easily drawn out four or five feet at right angles to its side, while a screwjack carried by each girder can be screwed down tight upon the permanent way to secure the additional platform thus afforded.

The two armoured cars which compose the rest of the train, are constructed to carry thirty men apiece. The front car carries a powder magazine, and the second carries the limber of the 40-pounder gun. This is provided with harness, so that, if necessary, farm horses could be attached to it to drag it into a position inaccessible by railroad.

There are wagons now being made which are each capable of taking two much heavier guns than the 40-pounders, and the experiment is projected of two quick-firing guns

\*A paper read at the Car Service Managers' Convention at Old Point Comfort, Va., June 19, by A. G. Thomason, of Scranton, Pa.



mounted on a single, armour-plated truck. It is also proposed to add to the train another truck carrying an electric searchlight.

### The Railroads of the World.

In the *Archiv für Eisenbahnwesen* for May-June, 1894, appear the tables published annually by that journal, giving data of the world's railroads. These tables give the lengths in kilometers of the total railroad systems of the various nations and states for the years 1888 to 1892 inclusive. They give also the increase in length in the five years and the percentage of increase. They give the area in square kilometers of the various countries and the population; and finally, the amount of railroad per 100 square kilometers and per 10,000 inhabitants.

We have converted into miles the absolute lengths and the lengths per unit of area and of population for the year 1892, and these appear in the table which follows. The conversions have been carefully made and we trust are more accurate than those of the unfortunate United States Census Bureau, which, it will be remembered, in the 1890 census, adopted the tables of the *Archiv* without giving any credit for them, and converted the quantities inaccurately, and omitted several important countries, for which gross "fakery" we felt called upon to rebuke the Bureau.

The total capital invested in the railroads of the world at the end of 1892 was about 33,216 million dollars, giving an average cost per mile of \$81,715.

RAILROADS OF THE WORLD IN 1892.

Country.	Length miles.	Length 100 sq. miles.	Per 10,000 inhabitants.
<i>I. Europe.</i>			
Germany:			
Prussia . . . . .	16,275	12.1	5.3
Bavaria . . . . .	3,597	12.2	6.3
Saxony . . . . .	1,584	27.4	4.4
Württemberg . . . . .	967	12.9	4.7
Baden . . . . .	1,000	17.1	6.0
Alsace-Lorraine . . . . .	1,005	18.0	6.2
All other German States . . . . .	3,027	15.0	5.8
Total Germany . . . . .	27,455	13.2	5.5
Austria Hungary, incl. Bosnia, etc.	17,620	6.8	4.1
Great Britain and Ireland . . . . .	20,325	16.7	5.3
France . . . . .	24,018	11.6	6.3
Russia, incl. Finland . . . . .	19,656	1.1	2.0
Italy . . . . .	8,498	7.7	2.7
Belgium . . . . .	3,379	29.6	5.5
The Netherlands, incl. Luxemburg . . . . .	1,913	14.0	4.0
Switzerland . . . . .	2,082	13.0	7.1
Spain . . . . .	6,771	3.4	3.8
Portugal . . . . .	1,425	4.0	3.0
Denmark . . . . .	1,283	8.4	5.6
Norway . . . . .	971	0.8	4.8
Sweden . . . . .	5,259	2.9	10.9
Servia . . . . .	336	1.8	1.6
Roumania . . . . .	1,622	3.2	3.2
Greece . . . . .	569	2.3	2.6
European Turkey, } Bulgaria, Roumelia, } Malta, Jersey, Man }	1,150	1.1	1.2
Total Europe . . . . .	144,380	3.9	4.0
<i>II. America.</i>			
United States of America . . . . .	174,784	6.0	26.8
British North America . . . . .	14,870	0.5	30.8
Newfoundland . . . . .	243	0.6	11.9
Mexico . . . . .	6,625	0.8	5.5
Central America . . . . .	622	0.3	1.9
United States of Columbia . . . . .	261	0.0	0.7
Cuba . . . . .	1,076	2.4	6.6
Venezuela . . . . .	497	0.2	2.1
Republic of San Domingo . . . . .	71	0.3	1.4
Puerto Rico . . . . .	11	0.3	0.1
Brazil . . . . .	6,390	0.2	4.3
The Argentine . . . . .	8,163	0.8	18.9
Paraguay . . . . .	157	0.2	3.4
Uruguay . . . . .	1,056	1.4	13.7
Chili . . . . .	1,936	0.6	6.0
Peru . . . . .	1,036	0.2	3.5
Bolivia . . . . .	593	0.2	4.1
Ecuador . . . . .	186	0.2	1.2
British Guiana . . . . .	22	...	0.7
Jamaica, Barbadoes, } Trinidad, Martinique, }	321	...	...
Total America . . . . .	218,910	...	...
<i>III. Asia.</i>			
British India . . . . .	17,768	1.1	0.6
Ceylon . . . . .	191	0.8	0.6
Asia Minor . . . . .	998	0.2	0.6
Russian trans-Caspian district . . . . .	890	0.5	12.7
Persia . . . . .	34	...	...
The Dutch Indies . . . . .	1,068	0.5	0.4
Japan . . . . .	1,876	1.3	0.4
Portuguese India . . . . .	51	3.5	1.0
Malay States . . . . .	87	0.3	1.4
China . . . . .	124	...	...
Cochin China, Pondichery, } Malacca, Tonkineto, }	142	...	...
Total Asia . . . . .	23,229	...	...
<i>IV. Africa.</i>			
Egypt . . . . .	961	0.3	1.4
Algeria and Tunis . . . . .	1,984	0.6	3.5
Cape Colony . . . . .	2,444	1.1	15.2
Natal . . . . .	399	2.1	7.3
Transvaal . . . . .	194	0.2	2.5
Orange Free State . . . . .	559	1.1	26.9
Mauritius, Reunion, } Senegal Territory, } Angola, Mozambique, etc. }	671	...	...
Total Africa . . . . .	7,212	...	...
<i>V. Australia.</i>			
New Zealand . . . . .	2,008	1.9	30.9
Victoria . . . . .	2,920	3.4	25.0
New South Wales . . . . .	2,399	0.8	20.0
South Australia . . . . .	1,823	0.2	54.9
Queensland . . . . .	2,352	0.3	55.9
Tasmania . . . . .	467	1.8	30.6
West Australia . . . . .	660	...	111.8
Hawaii . . . . .	56	0.8	6.2
Total Australia . . . . .	12,685	0.3	31.2
Europe . . . . .	144,380	3.9	4.0
America . . . . .	218,910	...	...
Asia . . . . .	23,229	...	...
Africa . . . . .	7,212	...	...
Australia . . . . .	12,685	0.3	31.2
Total of the earth . . . . .	406,416	...	...

### Railroad Matters in Chicago.

**Freight Traffic.**—The deliveries of grain at Chicago last week by the eleven leading lines aggregated 2,409,000 bushels, compared with 3,265,000 bushels the week ending June 17, 1893. The decrease was partly due to the continued uncertainty regarding the growing crops. It was also stated that the grain traffic will increase as soon as the coal miners' strike is ended, and the roads are enabled to secure a full supply of fuel. Live stock was larger than for the corresponding week last year. There was also a fair comparison in the miscellaneous traffic.

The outward movement of freight to the country was only fair; an early increase in such traffic is predicted, as there will be a revival of industry in the interior on the settlement of the strike. There is still some interruption to business in the iron regions of Minnesota, Wisconsin and upper Michigan by labor troubles and threats of strikes by iron miners. It is thought, however, that the defeat of the coal diggers will discourage the iron miners and that a strike will be averted.

The managers here are encouraged at the virtual settlement of the coal strike. When asked if the supply of coal will mean the immediate reinstatement of the trains recently withdrawn because of the scarcity of fuel, the officials reply that the trains will again be put on as fast as the demands of business require. All the important Western roads will be benefited by the resumption of mining. The Atchison, Topeka & Santa Fe will be especially benefited from the fact that it owns extensive mines in Illinois, Missouri, Kansas and Colorado. The Illinois mines although open only a little over a year are said to have been exceedingly profitable, as the coal finds a ready market in Chicago. Its Kansas and Colorado mines are also the chief sources of coal supply of those States. It is also claimed that the company is rapidly building up a trade in California for its Colorado anthracite coal.

	1894.	1893.	1892.
C. & N. West . . . . .	7,650	13,732	17,520
Ill. Cent. . . . .	1,350	1,350	...
C. R. I. & P. . . . .	4,500	6,300	3,875
C. B. & Q. . . . .	13,482	7,231	11,408
C. & Alton . . . . .	10,500	450	7,925
C. & E. Ill. . . . .	10,500	150	...
C. M. & St. P. . . . .	13,025	18,000	25,925
Wabash . . . . .	947	300	1,710
C. & Grt. W. . . . .	14,409	10,803	39,955
A. T. & S. Fe. . . . .	205	4,360	140
L. N. A. & C. . . . .	...	...	...
Total bbls. . . . .	66,518	62,676	108,458

The deliveries of grain (bushels) at Chicago, by the leading Western railroads for the week ending June 16 and the corresponding time the two preceding years compare as follows:

	1894.	1893.	1892.
C. & N. West . . . . .	377,000	707,000	316,000
Ill. Cent. . . . .	528,000	508,000	371,000
C. R. I. & P. . . . .	249,000	206,000	912,000
C. B. & Q. . . . .	515,000	766,000	1,426,000
C. & Alton . . . . .	124,000	105,000	173,000
C. & E. Ill. . . . .	27,000	64,000	62,000
C. M. & St. P. . . . .	328,000	475,000	1,059,000
Wabash . . . . .	101,000	165,000	137,000
C. & Grt. W. . . . .	66,000	115,000	294,000
A. T. & S. Fe. . . . .	91,000	154,000	402,000
L. N. A. & C. . . . .	3,000	...	...
Total bush. . . . .	2,409,000	3,265,000	5,152,000

**Passenger Traffic.**—The excursion business to the Summer resorts in the West and Northwest shows signs of an increase, with prospects of a material improvement ere the close of the month, though the business is done at very low rates. There are also evidences of improved travel from the country West and Northwest of Chicago to the Eastern seaboard resorts, and as much of such business pays full rates, the general passenger situation is more satisfactory than at the opening of the month.

The following shows the deliveries of flour (barrels), at Chicago by the leading Western railroads for the week ending June 16 and comparisons with the two preceding years:

**The American Railway Union.**—The threatened refusal to handle Pullman cars did not materialize. This created no surprise among managers. The leading spirits in the convention doubtless appreciated the force of the remarks of a delegate when he stated that the Union was not sufficiently powerful to combat the General Managers' Association. As the American Railway Union, Knights of Labor and other organizations have now held their annual conventions and elected their officers, it is not likely that anything more will be heard of strikes at present as those who were candidates for positions will no longer have occasion to manufacture capital by inducing the excitable and unthinking members to believe that they are greatly abused, and that their only means of redress is in striking.

CHICAGO, June 18, 1894.

### Compound Locomotives on the Lake Street Elevated, Chicago.

Some pretty conclusive evidence of the superiority for elevated railroad service of the compound type of locomotive is found in the performance sheets of the Lake Street Elevated Railroad, Chicago. The road has 20 compound locomotives and five simple. General Manager Alberger says that originally he was in favor of the simple locomotives, and remained so until, for several months in

succession, the performance sheets showed that the compounds were much more economical than the simple locomotives; the difference in favor of the compounds is so great that the simple locomotives are in service only when there are not compounds enough for the work. The returns for March may be taken as an average for the year, so far as coal consumption of the compound is concerned, as the weather was such that the steam heating system was in use about half of the time. A summary of the returns for March is as follows:

Total train mileage for March, 1894 . . . . .	67,080 miles.	
Coal consumed per car mile . . . . .	241,785	
Coal consumed per car mile . . . . .	9.51 pounds.	
Total wages for March, 1894 . . . . .	\$7,488.90	
Cost of fuel for March, 1894 . . . . .	6,551.61	
Cost of repairs for March, 1894 . . . . .	90.92	
Total cost . . . . .	\$14,408.17	
Total cost per car mile run . . . . .	\$ .0596	
Cost of repairs for March, 1894 . . . . .	\$ .1085	

About one-eighth of the total service was with five car trains. The item giving cost of repairs is small, due to the fact that the locomotives had been in service but a few months, and for this reason this item should not be taken as the final average cost per month throughout this year.

### Foreign Railroad Notes.

The Prussian State railroads give rewards to laborers who have served satisfactorily for 25, 35 and 50 years. In 1893 rewards of \$12 each were given to 1,312 men who had finished their 25th year of service, of \$14.40 each to 323 men 35 years in the service, and of \$24 each to five who had served 50 years. Several of the oldest workmen were decorated also. These payments are made only to the lower grades of laborers who do not belong to the permanent service of the railroads.

In 1893, 389 miles of new railroad "of public interest" were opened for traffic in France, making the total of the country 22,362 miles, of which 19,748 miles belong to the six great companies, 1,609 to the State, 698 to branch railroad companies, 199 are not chartered, and 138 are made in shops, yards, etc. Besides, there were at the end of the year 2,219 miles of local railroads, 188 miles of which were opened in 1893. There were also 1,033 miles of street railroad.

The railroad up Mt. Pilatus, near Lucerne, carried 29,476 passengers up the mountain in 1893, and earned \$37,520. The greatest number of passengers carried in one day was 681, on August 7. The working expenses were \$19,030, leaving \$18,490 net, which is \$3,718 more than in 1892. There was also a considerably larger income from the hotel on the summit belonging to the company, which was able to make a 4 per cent. dividend. This is the highest and steepest of the Swiss mountain railroads, and there are four other mountain railroads accessible from the lake of Lucerne, two of which ascend the Rigi, which, though not so high, much more frequently affords a clear view.

In Biel, Switzerland, there is a railroad school, a branch of the West Swiss Technical School. The branches of instruction are: Rolling stock, signaling, train service, shipping service, railroad law, rates, practical exercises in aid to victims of accidents. The school has been successful, and all its graduates this Spring had secured places on Swiss railroads before graduation. Formerly there was a one-year course, and a two-year course; now there is only a two-year course; but a three-year course is talked of. There were 114 pupils last Spring. They come from all parts of Switzerland, and from all classes, but a large part of them are sons or nephews of railroad employees.

Tourists before long may be carried by rail to the very foot of Mont Blanc, a charter having been granted for a line up the valley of the Arve to Chamonix, where it will be extended by a Swiss company to the railroad in the Rhone valley above Lake Geneva, through a most difficult country. Heretofore a 50-mile ride by coach from Geneva or a 30-mile ride by carriage over the mountains from the Rhone valley has been necessary to reach Mont Blanc—and has been one of the most interesting parts of the journey.

The Brussels Common Council has adopted a plan for an underground cable railroad proposed by the Engineer Grillon, of Liege. It is to extend from the upper to the lower town, the lower town having most of the heavy business, the theatres and nearly all the railroad stations. It is expected that there will be an average of 20,000 passengers daily over the line, with a maximum of 40,000, and that the travel will be heaviest from noon to 6 p. m.

The Pacific section of the Siberian Railroad, which is to extend from Vladivostok northeasterly to the Amoor river, following the Ussuri river a considerable distance, is called the Ussuri Railroad, and a few miles of it were built in 1892. Last January it was opened 122 miles, to a station called Chernigovke. The total earnings of the road down to the close of last year, had been \$15,550. The direction of this section of the road is determined by the boundary between Russia and China, which is formed here by the Ussuri river. Above the junction of this river with the Amoor the latter stream is navigable for many hundred miles, and will be utilized as part of the route.



## EDITORIAL ANNOUNCEMENT.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The conference of railroad commissioners and representatives of commercial bodies at Washington last week was attended by 20 or more prominent business men, including some from Cincinnati, Indianapolis, Chicago and St. Louis, and the sentiment developed was unanimous in favor of the passage of the Patterson bill to legalize pooling; but no light was thrown upon the question whether Congress is likely to pass the bill or when the subject will come up in that body for discussion. The Congressmen who do not favor pooling are mostly from districts farther west and south than those which these merchants hail from. But the Patterson Committee seems to be unanimous, and it is expected that the Committee on Rules will soon appoint one or two days for the consideration of this bill. So far as commercial interests are concerned, the fact that pooling (or its equivalent) is the only means of maintaining steadiness of freight rates seems now to be pretty well understood and conceded, regardless of geographical lines; but how far the views of merchants and manufacturers will affect those of Populists and others who think that mercantile interests and their own are at variance, remains to be seen.

Sir John Harwood, Vice-Chairman of the Manchester Ship Canal Co., recently submitted to the Town Council of Manchester a statement estimating a deficiency in the canal accounts by next December of £146,862, and said that the outlook, considering the company's obligations and probable receipts, is very serious. He then announced his resignation. At a meeting of the Council a week later, Wednesday, the 13th, Sir John's estimate was questioned by various members, and resolutions were passed expressing confidence in the financial success of the canal. Of course such resolutions would be passed, and we trust that the hopes of the Manchester people, with regard to the canal, will be realized, for it certainly would be a misfortune for all the world, and not confined to Manchester or the shareholders, if this great and costly enterprise could add nothing to the wealth of humanity. At the same time, Sir John Harwood's action is probably that of a courageous and discerning man who is determined not to fool himself, nor to allow the public to be fooled if he can help it. We have made particular inquiries recently with regard to the Manchester Ship Canal traffic, but the company is exceedingly reticent, and makes every effort to keep back precisely the information that the public ought to have. A private letter has been received by us, from Manchester, written within a month, by a man who is in a position to know as much about the ship canal affairs as an outsider can know, an engineer and a business man of experience and high standing. The writer estimates that the tonnage using the canal can scarcely have averaged 15,000 to 16,000 tons a week in, and the same out, since the opening last January, and the traffic has been most disappointing. It is impossible to form even an idea of the gross receipts, as there are different dues for different classes of goods, and many of the vessels come in with light cargoes, and still more go out only partially laden. Our informant thinks that the receipts could not possibly have been more than between £2,000 and £3,000 a week. On the other hand, he has no doubt that the cost of maintenance will be larger than has ever been admitted by the promoters. There will be considerable dredging on the Mersey end, owing to sand silting through the tidal openings. On the upper reaches

there will be dredging because of the deposit of sewage matter and other solids brought down by the Mersey and Irwell and their tributaries. The expenditures from the wash of the banks will also be heavy. This writer will be very much surprised if the working expenses and maintenance are less than £200,000 a year. Taking, then, the mean of his estimated gross receipts at £2,500 a week, we have a total of £130,000 for 52 weeks, leaving a deficit of £70,000 for the year. Sir John Harwood's estimated deficit up to next December is, it will be observed, more than twice this, and still nothing is allowed for interest on the cost of construction, and nobody yet knows what that will amount to. Many works have been deferred, and among well informed people in Manchester there is still great doubt as to what has been spent, and will be spent by the end of this year on the construction account. It is doubtless safe, however, to put this at £15,000,000.

Since writing the note above, the English journals have arrived with fuller reports than the cable gave us of Sir John Harwood's remarks. It appears that he finds that numerous and onerous obligations have been entered into by the Ship Canal Company which are so serious as to cause something like consternation in his mind. They reveal a state of things which must be characterized as at least most serious in regard to the future prospects of the canal company. Indeed, the fulfillment of all of these obligations would drain the resources of the City of Manchester. *The Economist*, a journal of great weight and certainly of very conservative character, says that to provide interest on five millions of pounds subscribed by Manchester, and to provide for the sinking fund, which begins in 1897, it will be necessary to impose a rate of over one shilling, seven pence, in the pound sterling. The capital account has now reached, according to that journal, about £15,407,000 and more money will yet have to be found to complete the canal and provide sufficient working capital. How, and by whom, the money is to be found remains to be seen.

The report of the M. C. B. Committee on Automatic Coupler Standards and Limits to the Saratoga convention is more complete and comprehensive than that of last year, and the conclusions arrived at by the *Railroad Gazette* at that time and stated then and since are corroborated by the tests made by this committee and presented in this year's report. The new matters in the report are the test of guard arms and the jerk tests, both of which are equally important with the tests made before. These show that a coupler may be strong enough for the drop and pulling tests, but be weak in resistance to jerks caused by the sudden starting of a heavy train by a powerful locomotive and in supporting blows delivered on the guard arms when switching or when coupling up. As a result of the last two years' work of the Master Car Builders Association, any one desiring to learn of the respective merits of most of the distinct varieties of designs and materials used in the vertical plane coupler, can now do so by studying the records of the Association. Those who had looked for definite conclusions in this year's report as to the best designs and materials for couplers have been disappointed, as the Committee has wisely refrained from giving specific opinions about devices and materials that have not been well tested in service, and about which there is only data enough for a few general remarks to guide purchasers; and it has confined its report mostly to statements of the facts developed under the conditions of the tests.

## The Master Mechanics' Convention.

The 27th annual convention of the Master Mechanics' Association was held this week, and the attendance, including members and friends, was probably the largest ever present. The interest in the reports and discussions was confined mostly to those on cracking of back tube sheets, exhaust nozzles and steam passages, boiler and firebox steel, and cost of maintaining locomotives. There was the same loss of time this year as before in the delay in presenting the reports, all of which results from the neglect to distribute the reports to the members so that they can be read and studied before reaching the convention. Further the resolution adopted by the assembled body that all reports be distributed to the members present at the first day's session this year was not carried out, for reasons unknown. As a result the discussions were curtailed rather more than is advisable for the best interests of a body that meets but once yearly. Had it not been for the excellent work of the President, the delay would have been greater than it was. Now the Association has again directed that the reports shall be distributed before the meetings.

The report on the cracking of back tube sheets was well discussed, and much valuable information was brought out; however, there still remains some doubt as to the real and fundamental cause, but there is an agreement as to a remedy and that is to allow vertical motion in the front row of stays to the crown sheet, so that when the tube sheet contracts and expands, either while firing up or at other times, the top flange of the tube sheet may not be subjected to serious bending action. The cracks in the tube sheet below the top flange, can evidently be prevented in most cases by allowing more space between the tubes, as this gives more metal between the tubes and increases the strength of the sheet.

The report on Oiling Devices for Long Runs met with favor and a good many were surprised to find to what extent such devices are already in use in this country. It is clear from the discussion that both time and oil can be saved by a careful arrangement of a limited number of oil pipes leading from the cab to those bearings that require the most oil and are the most liable to heat.

The report on Fire Kindlers shows that a considerable saving is possible in the cost of firing up locomotives by using oil or gas instead of wood, and where locomotives are frequently cleaned out the money value of a fire kindler may be very considerable.

The report on Exhaust Nozzles and Steam Passages was really a report on smoke-stacks, smoke-boxes and exhaust nozzles. This report showed that a greater vacuum could be obtained with a short smoke-box than with a long one; with a low exhaust nozzle than with a high one, and with a taper stack than with a straight one. The work done by the committee is of a kind that reflects credit upon the Association, and is that class of investigation that is needed to raise the association to a scientific plane and make its proceedings more useful to those having in charge the practical operation of locomotives, and to keep it ahead, in dignity and importance, of the rapidly advancing railroad clubs. The discussion on this report was much shortened by lack of time, and some opinions needed by the committee to assist in next year's work were not obtained; but under the circumstances this was unavoidable, and probably what is desired can be obtained by correspondence. Those who are interested in the causes of fires set by locomotives and in the question of long vs. short smoke-boxes, and straight vs. diamond stacks, will find in this report and the discussion thereof some food for thought.

The report on Boiler and Firebox Steel contained a specification for firebox and shell steel that was adopted as a recommended practice of the association. This specification is one that no reasonable steel maker can find fault with, as its requirements have wide limits and are easy to meet; in fact the limits are rather too wide to suit some who prefer the best quality of material. The Committee came to the convention well fortified with data to support the recommendation, and among other things to show that what is generally considered to be a far too high percentage of phosphorus and sulphur has not in some cases prevented a firebox sheet from giving good service. The data on this was small and if it shows anything at all it is that the failure of firebox sheets is quite as often due to the treatment the boxes receive in service as to the nature of the material. The starting point of a standard specification is now established by the one recommended, and year by year the present wide limits as to physical tests and chemical composition may be drawn close so that eventually the specification may be one that steel makers can follow, in making stock plates, with confidence that the stock can be used to fill future orders.

The reports not mentioned here had not been discussed at the time of writing.

## Metropolitan Railroads in New York and London.\*

We are often told that the competition for short distance travel in London is intense and is one of the most troublesome elements in the actual situation. This is quite true, and yet, except in the one item of fares the competition in New York is probably quite as severe. The omnibus traffic in London is very large. We have no recent figures, but in 1888 the London omnibuses carried 116,000,000 passengers. Doubtless this traffic increases from year to year, and much of it is done at penny fares, say two cents. The London omnibus is an efficient instrument for city passenger traffic, but would be intolerable in New York. The hundreds of miles of beautiful wooden pavement in London make the passage of omnibuses almost noiseless and make them tolerable to people who ride in them. They have seats on the roofs where one can smoke and look out at the

\*The preceding articles of this series will be found in the *Railroad Gazette* of May 18, June 1 and June 8.



street sights as he journeys along. But, on the whole, the street car accommodation in the city of New York is very good. The elevated railroads have to compete with cable roads and with horse cars well equipped and running at good speeds the whole length of the island. Such lines run through the center of the most crowded district and also run beneath the elevated roads throughout most of their length; and in 1890 carried 214,000,000 passengers. On the whole, in the matter of competition, there is, perhaps, not very much to choose, except that, as we have said, the omnibus fare in London (two cents for short distances,) is much cheaper than the five-cent fare of New York; and yet even this element is less important than it seems on its face, for two cents in New York means a good deal more than one penny in London.

It remains to consider the geographical position of the two systems. The New York lines run up and down the island, directly on, or parallel to, the great streams of travel. The extreme width of the island below Central Park is about two miles, and in this width there lie four parallel lines of elevated railroad. The result is that throughout this whole region one does not have far to walk to an elevated railroad station; and while many people find this distance too great for convenience the city is far better served in this respect than London.

The underground system of London reaches at its eastern end one of the most densely occupied regions in the world; that is, "the City" having an area of about one square mile, crowded with street traffic. This is the heart of London, but westward from this district both of the lines skirt the most thickly populated region, and leave between them an area having a maximum width of two miles, only the edges of which they can serve. The Metropolitan District line runs on the south side of this region and the Metropolitan on the north. This is the region which it is proposed to intersect from east to west by the Central London (underground) Railway, a project which was approved by Parliament in the session of 1892. This proposed line passes under Oxford street, Holborn and Holborn Viaduct, and so right across the center of the city to the Liverpool Street station of the Great Eastern Railway. But, although the existing lines only command the flanks of this very important Metropolitan District, still they really traverse a dense city throughout most of their length, and their whole length is through an old and well built up region; and he would be a bold engineer who to-day would advise against building these lines, even with the present knowledge. It is through this region that the omnibuses get their harvest, and working as they do on the chords of the arcs occupied by the underground railroads, they have a great advantage in competition.

But the whole problem of the location of rapid transit lines in London is entirely different from what it is in New York; first, because in New York the travel is on parallel lines up and down a narrow island, and in London it radiates in all directions from a common center; and, second, there are in London more important secondary centers of trade and industry and residence than there are in New York. Some light may be thrown on the impossibility of serving "the City" by any one system of lines by some of the facts learned by taking a day census. On May 4, 1891, an accurate account was made of all persons and all vehicles entering the City (City of London proper), hour by hour, for the twenty-four hours. It was found that 1,186,094 persons entered that region on foot and by various conveyances. In the same time a total of 92,372 vehicles entered the City of which 18,000 were cabs and 10,389 omnibuses. Of all these people the underground railroads carried into the City only 78,000. Other railroads delivered 188,400, and there came over the bridges from south of the Thames 196,500. From the district to the westward, which might be served in some degree by the existing underground roads or by the projected Central London Railway, about 175,000 people entered the City aside from the 78,000 mentioned above. From the region to the north and northeast there came about 365,000 and from the east and southeast 155,000 more.

We may now sum up some of the reasons why the elevated railroad system of New York earns four times as much gross revenue per mile as the London underground system and pays a good deal better return on about 35 per cent. heavier capitalization.

The actual carrying capacity of the two systems as operated to-day is not very different. The underground trains can seat more passengers, but the elevated trains can carry more in the aggregate, seated and standing. In frequency of trains the New Yorker has a great advantage. At the times and stations best served in the two cities he can get trains twice as often in New York as in London, and for long distances the London system fails absolutely to come within our notions of

"rapid transit," the trains being run at half-hour intervals. In frequency of stations also the New York system offers considerable advantages. In speed there is no material difference. In fares the Londoner who goes third class has an advantage up to near  $2\frac{3}{4}$  miles. Beyond that the advantages of the New Yorker increase very rapidly. In comfort and general attractiveness the New York system is decidedly better. In the element of external competition the difference is perhaps not great, although it would require a much more elaborate study than we have been able to give to the matter to say anything very positive as to this element. The geographical advantage of the New York system is very great.

It would be impossible to assign to each of these elements its relative value. This would be an interesting study, and indeed our analysis could be carried much further with profit. But from what we have ascertained so far we venture to say that the first element in importance is geographical, the second, frequency of service, the third, attractiveness of cars and surroundings. The first two are, of course, independent of the system adopted; that is, they do not depend upon whether it is overhead or underground, but in the third an overhead system must always have the advantage. Anyone who thinks of putting money into intramural railroads and especially into such railroads in New York City will do well to consider carefully all of these elements, for they are all more or less controllable and we know of no project for such railroads in any of the great cities which offers such certainty of large returns that the investor can afford to risk his money without a very careful study.

#### Fluctuations in Working Expenses.

While some commentators on recent railroad earnings and expenses seem to accept all reported decreases of working expenses as pure "savings," others apparently look upon them all as suspicious, and compare the percentage of expenses of one month with that of the following and preceding month as if they might thereby discover some impending catastrophe. But it will not be easy to discover anything by such comparisons, except that railroad expenses are not naturally distributed evenly and in proportion to traffic among the twelve months of the year. Expenditures for maintenance of way cannot be made to any great extent except when the weather is favorable. One year extensive repairs may be made in April or May which could not be made in another year until a month or more later. Repairs of rolling stock are often kept down in very busy seasons because everything that can possibly be used is needed to carry the traffic, and a great accumulation of repairs is put off till business falls off.

How expenses vary in normal times—at least in times when there was no such necessity, as at present, for limiting expenditures to the strictly indispensable—may be seen by comparing the expenses of successive months on different railroads for different years. For instance, the Chicago, Burlington & Quincy, which has always been able to command money when it wanted it, and so has made its expenditures at the seasons when it seemed that they would do the most good, spent the following percentage of its gross earnings for working expenses in the months named: In January, 74.4 per cent. in 1891; 68.35 in 1892; 72.27 in 1893, and 66 in 1894. And in the first four months of 1893 these percentages were successively by months: 72.3, 68.5, 66.6, 75.8. The variations were greater than they have been this year, namely: 66.0, 64.0, 59.0, 66.3. The decrease in expenses in April was extraordinarily large this year because the total expenses were extraordinarily large last year. The working expenses in successive months of the last four years have been:

	Jan.	Feb.	March.	April.
1894 . . . . .	\$1,740,557	\$1,553,089	\$1,606,653	\$1,655,324
1893 . . . . .	2,205,339	2,043,423	2,235,774	2,266,033
1892 . . . . .	1,662,362	1,636,742	1,705,857	1,619,705
1891 . . . . .	1,339,433	1,278,770	1,269,818	1,288,984

It has caused remark that the expenses in April were \$610,700 less than last year; but last year they were \$646,300 greater than the year before, the mileage worked having increased but little in the four years. For the four months ending with April, the Burlington's working expenses, though \$2,194,947 less than last year, were only \$69,044, or about 1 per cent. less than in 1892.

In all such comparisons, the companies which have been accustomed to make considerable improvements which they have charged to expenses, are likely to show not only the greatest, but the most irregular decreases in expenses. Additions to the property may have been made in a few months of the twelve, and the simple suspension of such work may in those months make a very important reduction in what was reported as expenses. Such roads as the Lake Shore, which has

spent many millions in improving its property without any addition to its capital account, can make marvellous reductions in expenses now with ease.

All this does not make the present falling off in earnings any the less, but it shows that the railroads—very many of them, at least—are not so near disaster as some would have us think. On the other hand, the lines which have had but a narrow margin in good times, and kept their working expenses then down to the lowest possible point, are certainly being very severely tried now.

One of the leading characteristics of railroad practice in America is the complaisance toward the free and easy habits of the people. Americans do not like to be counted through a gate like cattle, so the railroad companies allow them to enter the cars pell mell and pay their fare after they have seated themselves—provided the conductor is sharp enough to distinguish those who have paid from those who have not. We must have railroads whether we can afford suitable facilities or not. Hence, at many towns the only essential requisite in the way of a station is that trains shall stop. It does not much matter where, provided only it be at some point where the bottom of the ditch is not more than two or three yards below the level of the rail. A stopping place where there is a broad expanse of level ground, so that a large number of passengers can (in dry weather) disembark quickly and conveniently, is really luxurious as compared with the standard at hundreds of so-called railroad stations. The fashion of providing platforms three or four feet high, to facilitate easy access to cars, was long since abandoned in order to permit the passage of passenger cars to all parts of the country without the necessity of making special provision for places where the car steps and the station platform might not be within a convenient distance of each other. Lately, however, an esteemed contemporary has agitated the question of abandoning the convenient plan of having all cars provided with steps so as to be easily entered from the ground, and going back to the old English fashion of having station platforms on a level with the floors of the passenger cars. In view of the fact that platforms at the level of the rail, or only a few inches higher, are almost universal throughout the United States, this agitation can hardly be regarded as of much moment, but it is perhaps worthy of note that, just at the same time, the President of the British Board of Trade, in response to an inquiry made in the House of Commons, has been obliged to apologize for the unsatisfactory condition of passenger station platforms in England, where the practice of building them just as high as the car floors is still universal. It appeared from a criticism that at a station on the Metropolitan Railway where the track was curved there were open spaces, claimed to be 8 in. or 10 in. wide, between the platform and the cars. Mr. Bryce said that the question of the open space between the carriage and the platform was continually engaging the attention of the Board. The difficulties are such that "they could not be entirely avoided except by adopting the continental system of no platforms at all."

At the first meeting of the new commissioners appointed under what is known as the "Chamber of Commerce bill," providing for a new scheme of rapid transit for New York city, they elected a successor to Mr. Alexander E. Orr, who was named as a Commissioner in the Rapid Transit Act, but who became an *ex-officio* member of the Board by his election as President of the Chamber of Commerce. The Board has the power to fill any vacancy that may occur in its number, and it was expected that Mr. Orr would be succeeded by Mr. Charles S. Smith, his predecessor as President of the Chamber of Commerce, a public spirited citizen who had been influential in securing the passage of the Act. The vacancy was filled by the election of Mr. J. H. Inman, a member of the old Board of Rapid Transit Commissioners, which was legislated out of office by the new rapid transit law. This was a surprise for the people of the city, and is regarded as a defeat of the so-called Chamber of Commerce element, which has been active in promulgating the plan for building a rapid transit road, with the aid of the city's credit. Mr. Inman was elected by the votes of the Mayor, the Comptroller, and Messrs. Steinway and Starin, members of the old Rapid Transit Board. Commissioners Orr, Low and Claflin were in the minority. Mr. Inman, in his previous experience as a rapid transit commissioner, made as creditable a record as any of his associates, and while the passage of the present bill through the State legislature was in doubt, he urged its adoption. The personnel of the commission is not at present of the greatest importance, however. The law under which they are acting, directs that the proposition authorizing the city to lend its credit to secure the building of the road is to be submitted to a vote of the people, and until the result of that vote is known the commissioners will have little to engage their time. At a later meeting, the Board completed its organization by electing as counsel, Henry R. Beekman and A. B. Boardman; as Secretary, Louis A. Delafield, and as Chief Engineer William Barclay Parsons. The counsel are distinguished and experienced men and are certainly a strong selection. Of the Secretary we know nothing, but the choice of Chief Engineer is first rate. To be sure, Mr. Parsons has some predilections towards a subterranean system; but we suppose that that is the only kind of a system that can be considered now anyway; and whatever his predilections are he will attack the subject with experience and knowledge and judgment.



A car in a passenger train of the Highland Railway of Scotland was derailed at Dunphail on April 27 last, by the failure of a wooden wheel, and Major Marindin has made a special report on the accident to the Board of Trade. The train was slackening for the purpose of stopping at the station and only one passenger was injured; and the special report is published apparently because a wheel failure of this kind is very unusual. The last of the kind recorded was in 1881. The wheel was a Mansell wheel 3 feet 7 inches in diameter, with a teakwood center. The pieces of wood were fastened at the center by a boss through which there were eight one inch wrought iron bolts, and the inspector believes that the breaking up of the woodwork began by one of the bolts coming loose, after the bolt hole had become enlarged by wear; thus whenever the brake was applied splintering took place. The wheel was retimbered in 1893. The wood was sound, as was that in all the other wheels of the car. But perhaps the most salient point in Major Marindin's report is the statement that the train ran about three miles after the wheel had dropped off the track, there being no bell rope or other communication with the engine, except the air brake. Two brakemen who ought to have been in the front portion of the train, near the car that jumped the track, where they would have discovered the trouble and could have applied the brake, were at the rear, where they had no business. Running the train without a bell rope was contrary to a law passed in 1868, as the train regularly runs more than twenty miles without stopping, but whether any action has been taken against the road for this clear breach of the law does not appear from the present report. If the law still holds it to be perfectly safe and proper to do without the bell rope on trains which stop every nineteen miles or oftener it may well be that the prosecuting officer thinks it not worth his while to bother with infractions where the distance run without stopping is only a few miles greater. The head guard of this train, which was a night train, had worked in that capacity for over thirty years, but the train never has a communication cord when he runs it, he says.

The subway for the tracks of the Philadelphia & Reading, in Philadelphia, from Fourteenth street westward to Twenty-first street and beyond, seems to be now assured, Judge Dallas, of the United States Circuit Court, having rendered a decision giving authority to make the proposed contract with the city. There was a long argument upon objections made for Isaac L. Rice, who claimed that the intended outlay conflicted with the rights of the income mortgage bondholders, but Mr. Rice says that he is well satisfied with the decision, as it facilitates the building of the subway without weakening the security of the income bonds. The receivers asked and the master originally reported that the receivers might make a contract for the entire \$3,000,000 (half the cost of the improvements). To this Mr. Rice's counsel filed a formal exception. Thereupon the master changed the order to one authorizing the company, instead of the receivers, to make the contracts. The receivers then suggested that they would have to give \$500,000 security in addition in order to satisfy the city. Mr. Rice had no objection to this, if it did not involve giving priority to the subway over the preference income interest. Judge Dallas' decision satisfies this condition. The Court has placed \$500,000 as the limit of the receivers' participation in the matter, and distinctly reserves and excepts from adjudication the question whether the subway interest (and, therefore, anything on a par with it, like terminal interest) will come ahead of or behind the income interest. The substance of the Court's order is that the road may pay one-half of the amount of the interest upon the cost of the work, not exceeding interest upon \$3,000,000, and one-half of the amount of the principal of the loan, to be made payable in 20 annual instalments, beginning 10 years after date, not to exceed \$3,000,000. The Mayor says the loan will be negotiated as soon as possible. A description of the proposed improvement was published in the *Railroad Gazette* of January 12 last.

Chancellor McGill, of New Jersey, has dissolved the injunction which prevented the Camden, Gloucester & Woodbury electric railroad from crossing the track of the West Jersey, and, if the press dispatches give a correct report, he holds that electric street railroads have practically all the rights and privileges of horse railroads, and that the regulation of speed and the establishment of safeguards are within the province of the municipalities. This is all right, provided the cities and towns do regulate. But the people of a town who use a new electric railroad are pretty sure to be more interested in speed than they are in the somewhat remote question of safety at a railroad crossing, and their representatives, the town officials, are liable to be guided too much by the people's views. Moreover, the regulation of the speed of street cars at crossings of high-speed standard railroads is such a difficult matter to manage that in many cases the only adequate "regulation" is to require the street railroad, at the outset, to be built above or beneath the standard railroad. In this view of the case Chancellor McGill's decision becomes harmful. Again, he seems to have overlooked the fact that an electric car, unlike a horse car, is peculiarly in danger on a railroad crossing, because the roughness of the track there increases the liability of the power to fail temporarily and leave the car helpless in a most dangerous spot. Electric cars are so much heavier than horse cars that the danger to steam railroad trains is considerably greater; this is one more reason why the regu-

lation of the matter under discussion should be placed within the jurisdiction of some body possessing broader powers than a municipality.

The railroad telegraph superintendents had an interesting convention at Detroit last week. These men go even further out of their own field for subjects of discussion than do the members of the superintendents' society, but we do not know that this does any harm. In fact we have heretofore commended this tendency. The telegraph men certainly ought to get together occasionally, and it is much better to talk over electrical matters than to devote their whole time to general passenger agents' scenery. The telegraph superintendent is often the best informed man on his road, in some or all departments of electrical science, and as he is generally one who has been brought up in the general manager's department, under conditions favorable to learning all the needs of that department, he may naturally and properly feel that he should be at the head of all electrical work. But whether many roads will adopt the first rule proposed by the committee at Detroit, ("The management of the Telegraph and all other electrical business of the company is in the hands of the superintendent of telegraph . . .") is another question. How will that work when the company puts in service some 50-ton electric locomotives? Perhaps the most suggestive paper at the Convention was that on telephones in railroad service. Mr. Selden's idea of spelling out words so as to reduce the speed of transmission to the speed of ordinary penmanship is practicable, certainly. But Mr. Hammond, who has used the telephone for train orders several years (on the Boston, Revere Beach & Lynn) and who told his experience in the *Railroad Gazette*, December 30, 1892, has not found this necessary.

The Chicago, Rock Island & Pacific Railway, whose report for the year ending with March last has just been published, has been remarkably fortunate in maintaining its earnings; better, we believe, than any of its neighbors. Indeed, it had a slight increase in gross earnings in a year, five-sixths of which was generally very unfavorable. There was also a decrease in expenses, though small in proportion to what many other roads show, with the result that the net earnings increased \$174,154, or nearly 3 per cent. There was no increase in mileage in the aggregate, but a Texas connection was completed which may have increased considerably the traffic over the long line thence to Missouri river points and Chicago, and the Nebraska extension, completed at the close of the previous year, permitted the handling of Colorado business by that route. The passenger traffic (mileage) was 24 per cent. greater than the year before, though the number of passengers was decidedly smaller, a result caused by a combination of the World's Fair and the hard times, which has been shown on many Chicago railroads. The freight traffic was also a little greater than the year before, but the freight earnings were less, due to a decrease from 1.05 cents to 1.0 cent in the average rate per ton per mile. The company is very fortunate in passing through so bad a year so satisfactorily.

An appropriate meeting was held by those in attendance on the Master Car Builders' and Master Mechanics' Conventions at Saratoga last Sunday evening, especially for the purpose of paying respect to the memories of Joseph K. Bole, Robert Ross, A. R. Slack and Major Paul, whose deaths we have had recently to record. Mr. Morris, of Pittsburgh, who was Chairman of the Memorial Committee, had charge of the services. The church service was read, and a surplised choir from one of the churches sang. Mr. M. N. Forney read the memorial resolutions, which were adopted. All of these men were men of mark in the various businesses to which they had devoted themselves, but Mr. Bole was doubtless the best known of them all. He was a man of such activity and energy, and such generous nature and of such high character, that he had won to an unusual degree the affection and the respect of those with whom he had been brought in contact during his active life. He had made an important mark in the industry of the country, and leaves behind him in the affectionate memories of his friends the best monument that a man could build.

We noted last week the appointment by the President of a board of engineers to consider the proper and practicable length of span for the proposed New York & New Jersey bridge, but the composition of this board is so unusual that we call special attention to it. It consists of Messrs. George S. Morison, Theodore Cooper, W. H. Burr, L. F. G. Bouscaren, civilians and Major C. W. Raymond, Corps of Engineers, U. S. A. Certainly none of these gentlemen need a word of introduction to our public. They are all members of the American Society of Civil Engineers, and all distinguished, and the man who thinks that he can fool them or influence them unduly had better try it. We like to picture to ourselves the state of the man who should approach any one of these gentlemen with suggestions of "sugar." We do not pretend to think that the meetings of this board will be like sailing over summer seas, but the public may sit down perfectly satisfied that whatever conclusion is come to is as honest and sound as human results can be.

The rapid transit situation in Boston has taken an astonishing turn by the passage of the Meigs elevated railway bill through the House by a vote of 121 to 28. The bill authorizes the construction of this absurd struc-

ture through some of the busiest streets of Boston, and into the most important suburban towns. Presumably it is a purely speculative enterprise. It is hardly possible that the road can ever be built and put into operation, but if the bill passes the Senate by any such majority as it got in the House a veto by the Governor will be unavailing, and there will be a fine opportunity for selling stock.

## TECHNICAL.

### Manufacturing and Business.

The Fox Tie-Plate Co., of Hamilton, Ont., has been incorporated with a capital of \$10,000.

The Ontario Engine & Machine Co., of Toronto, has been incorporated with a capital of \$12,000.

The Railway Specialty Co., of Chicago, has been organized with C. S. Burton, Joseph Schneeder and E. T. Wray as incorporators.

Mr. Charles T. Crane, one of the receivers of the South Baltimore Car Works, announces that the company will pay a 25 per cent. dividend to creditors before July 1.

The California Railway Equipment Co. has been incorporated in California by John W. Bourdette, S. C. Denson, James T. Hall, N. A. Acker and W. R. Craig, with a paid up capital stock of \$12,500.

Queen & Co., of Philadelphia, call attention to the Acme testing set made by that firm, which, on account of its compactness and lightness is having a constantly increasing sale. It weighs but 6 lbs. and is contained in a box 8 in. x 6 in. x 5 in.

Messrs. T. Isbester and H. Woodland, formerly connected with I. A. Williams & Co., on the Utica Headlight Works, have recently taken the Western agency of the Star Headlight Co., of Rochester, N. Y., with offices in the Western Union Building, Chicago.

The Gold Car Heating Co. has introduced its system of car heating very largely on English railroads within the last few years, and every little while extends its equipment to another English railroad. A few weeks ago it received an order from England for 300 thermostatic steam traps for one of the English railroads using its steam-heating system.

The Link Belt Engineering Co. has recently contracted with the New York, Ontario & Western for the erection of a locomotive coaling station at Hancock Junction, N. Y., where the Scranton branch of that road leaves the main line. Locomotive coaling stations for the New York Central & Hudson River Railroad at Lyons, East Albany and Croton, N. Y., have just been erected by the Link Belt Engineering Co., from designs furnished by the company.

The steam shovels for excavating the Chicago Drainage Canal have been furnished largely by the Bucyrus Steam Shovel & Dredge Co., of South Milwaukee, Wis., who have now 14 shovels of their make on the work and are constructing five more, which will be ready within a few weeks. The Bucyrus Co. recently secured orders from McArthur Brothers, contractors on the canal, for two other shovels, one of which will be the largest and most powerful machine of the kind ever built. Four steam shovels of the same pattern have also been ordered from the company by Messrs. Griffith & McDermott. The company has other large orders for dredges and steam shovels. It is increasing its force as rapidly as possible and working over time.

### Iron and Steel.

All departments of the Wheeling Iron & Steel plant at Benwood, W. Va., resumed June 19, after a month's shutdown, giving employment to 800 men.

### New Stations and Shops.

The Ohio Valley Railroad Co. proposes to remove its De Koven repair shops to Henderson, Ky. Plans for the new shops are now being prepared.

The proposed terminal improvements of the Louisville, Evansville & St. Louis, in East St. Louis, are assuming definite shape. The plans for the new station to be erected near the Broadway viaduct have been accepted by the company's officers, and work on this structure is to be started at once.

The handsome new station of the Old Colony Division of the New York, New Haven & Hartford, at North Abington, Mass., has just been opened. The building is of stone with overhanging roof, the main dimensions being 25x100 ft. The interior is well arranged and the finish is in ash. The waiting rooms have open fireplaces.

The property needed for the Union Station of the Seaboard Air Line at Atlanta, Ga., has been purchased, and the erection of the new building will soon begin. The property will front on the right of way of the Western & Atlantic Railroad. The building will be one of the largest stations in the South and will cost about \$200,000.

The new shops of the Kansas City, Pittsburgh & Gulf, at Pittsburgh, Kansas, are nearing completion. Master Mechanic Woodhouse expects soon to have about 150 men employed in the shops. The new machinery for the shops is now being received, and part of it is being erected in the present repair shops until the new shops are ready to be opened.

The plans for the proposed repair shops of the Boston & Albany at West Springfield, have been completed, and it is expected that work on the foundations for the new buildings will be commenced in August. Four buildings are to be erected, all of brick. It is said that the company



intends to put in new machinery almost entirely, and will transfer few of the tools in the present Springfield shops, to West Springfield.

The matter of the site for the proposed shops of the Buffalo & Susquehanna road has been finally settled, Galeton, Pa., being selected instead of Austin, the headquarters of the company. The dimensions of the buildings are: Paint shop, 50x150 ft.; round-house, 70x180 ft. containing 17 stalls, of which six will be at once built; machine shops, 100x150 ft.; car shops, 75x135 ft.; planing mill, 50x80 ft.; office, 40x70 ft.; a 60-ft. turn-table will be put in.

The Baltimore & Ohio Railroad has decided to build a freight receiving station in the Kensington Mill section of Philadelphia. The building will be 25 feet by 50 feet, located at Lehigh avenue and Howard street. The railroad does not reach this part of the city with its own tracks, and freight will have to be carted to a pier and then taken by barge to Pier 2, where it will be loaded on the cars.

The Lake Shore & Michigan Southern proposes to build new general shops at Toledo, O. Last week officers of the company applied to a committee of the Toledo City Council, asking that Junction avenue be closed as a public street to give room for the proposed shops. The closing of this street will enable the company to make use of five acres of ground for the shops. It is said that the new shops will employ about 1,000 men. President Newell says that the company is ready to build the shops at Toledo if the city will readily grant the concessions asked by the railroad.

#### The Ocean Ship Kensington.

The steamship "Kensington," of the International Navigation Co., whose trial trip was briefly noted last week, is one of two freight and passenger steamships which have recently been built for the company on the Clyde. The other ship, the "Southwark," was delivered about the first of the year, and has been running in the Philadelphia-Liverpool service since then. The Kensington will reach America on her first trip about the end of this month. Her dimensions are: Length, 480 ft.; breadth, 57 ft.; depth, 40 ft., and her gross tonnage, 8,668 tons; net, 5,645 tons. Her displacement on a 27-ft. draft is about 15,000 tons, and she was designed to carry about 8,000 tons dead weight.

#### Wooten Fire Box Patents.

The Wharton Railroad Switch Co., of Philadelphia, which controls the Wooten patents, has brought suit against the Rogers Locomotive Co. for infringement, and an injunction and account of damages and profits is asked for. The patent sued on relates to a wide firebox without a combustion chamber and fire bridge, and the complainant claims that quite a number of engines which infringe it have been built by the Rogers Co., as well as by others. J. Snowden Bell is the counsel for the complainants.

#### Car Heating.

The Gold Car Heating Co. states that none of the Gold systems of car heating infringe the Cody patent, and the Gold Company has just issued a circular explaining why there is no infringement, which will be sent to any one interested. The Gold Car Heating Co. also reminds its patrons and railroad men that it has a full license under the Towne patent, which claims broadly the employment of a liquid circuit with Baker stove on the car, and means for heating this circuit by steam from the locomotive.

#### The Nicaragua Canal.

The House Committee on Commerce is trying to get a definite statement of the money expended by the Maritime Canal Co. (Nicaragua) in the work already done. It is claimed in general that about \$7,000,000 has been spent, and Senator Morgan's bill provides that the company shall receive \$11,000,000 for disbursements and concessions. When the Committee satisfies its mind on this point, we trust that it will still remember that nobody has ever placed before it a valuable estimate of the probable cost of building the canal. At least, such an estimate has never been made public.

#### The Buda-Pesth Bridge Competition.

The *Railroad Gazette* of October 13, 1893, contained the programme of an international competition for two bridges over the Danube, at Buda-Pesth, to close January 31, 1894. The jury has just published the awards. The first prize of \$12,150 is given to the Esslingen-Stuttgart Machine Co. for a one-span, American type, wire suspension design for the Escuter bridge. (Estimate of cost, \$1,820,000.) The second prize of \$8,100 has been awarded to J. Feketchary, retired Chief Engineer of the Hungarian State Railroads, for a three-span, cantilever design for the Fovamter Bridge. A third prize of \$4,050 was created for the design of the Reschitzner Rolling Mills, Hungary, for a cantilever bridge at Fovamter. The jury decided further to purchase from four to six of the total of 76 designs which were presented.

#### Electric Illumination of the North-East Sea Canal.

The electric illumination of the North-East Sea Canal has been let to the Helios Co., of Cologne, to be in operation by April, 1895. Along the two shores 884 incandescent lamps of 25 candle power each will be placed on posts 13 ft. high at distances of 820 ft. Besides these lights, 68 others will serve to light better the 13 canal ferries and the 4 swing bridges. The locks will be lighted by 12 arc lights each, and the canal entrances will be shown by colored lights of long range. For the two stretches of 3930 ft. and 18,800 ft., where the canal traverses lakes, oil gas buoys are provided. The light

stations are located at the two ends of the canal, at Holtenau and Brunsbuettel.

#### The Hall Signal Company.

The annual meeting of this company was held at Portland, Me., June 13, and the following officers elected for the ensuing year: Directors: Dr. W. Seward Webb, Hon. Thomas L. James, John L. Houston, Charles E. Parker, Wallington A. Miller, Wilfrid G. Gilmore, and William P. Hall. President, William P. Hall; Vice-President, Charles E. Parker; Treasurer, W. S. Gilmore; Clerk, Hon. A. A. Strout; Secretary, Melville P. Hall. The business of the company was reported to be large, profitable, and constantly increasing.

#### Reorganizing the Pennsylvania Steel Co.

Two plans for the reorganization of the Pennsylvania and Maryland Steel Companies have been submitted for adoption by the committees appointed by the stockholders and creditors. The Stockholders' Committee, of which N. P. Shortridge is Chairman, proposes an amicable adjustment, and the Creditors' Committee, of which Alfred Earnshaw of Boston is Chairman, proposes a sale of the properties. The indebtedness to be taken care of in addition to the \$1,000,000 first mortgage bonds of the Pennsylvania Company, and the \$2,000,000 first mortgage bonds of the Maryland Company, is \$6,088,015. The amicable plan contemplates raising \$1,500,000 cash as additional working capital. This plan provides for a surrender by the stockholders of 50 per cent. of their present holdings of common stock to the Reorganization Committee. Stockholders are then asked to subscribe an amount equal to one-third of their present holdings of common stock to the new preferred stock, receiving back an amount of common stock equal to their subscriptions to the preferred stock. The balance in common stock in the Reorganization Committee's hands will be transferred to the creditors in part satisfaction of their debt. The settlement with the creditors gives them further 40 per cent. in cash and 60 per cent. in consolidated bonds upon the plant at Steelton, the plant at Sparrows Point, the company's ore mines in Cuba, and other property, which bonds will be secured by mortgage to the amount of \$7,000,000, \$3,000,000 of which will be reserved for the redemption of the prior mortgages. In case the amicable plan of adjustment fails to receive the assent of the stockholders, and the subscription by them of one and one-half millions of preferred stock, then the re-organization agreement provides that the Committee shall be authorized to proceed with the sale of the property under the second plan, on behalf of the creditors who subscribe to it and the subscribers to the new preferred stock only, the present common stock being wiped out. Under this second portion of the plan, therefore, the company will be re-organized and the creditors will receive in the new company the same treatment which they would have in case the amicable plan succeeds, that is, 40 per cent. in cash, 60 per cent. in new consolidated bonds and 15 per cent. in new common stock. After reorganization, the capitalization of the company will, in round figures, be as follows: First mortgage upon Steelton plant, \$1,000,000; First mortgage upon Sparrow Point plant, \$2,000,000; General consolidated mortgage (of which \$3,000,000 will be reserved to take up these two issues of bonds at their maturity), \$7,000,000; Preferred stock, \$1,500,000; Common stock, \$5,000,000.

#### THE SCRAP HEAP.

##### Notes.

The Atchison, Topeka & Santa Fe has reduced the working time in its shops to 32 hours a week. The shops of the Baltimore & Ohio at Mount Clare, Baltimore, are closed for two weeks.

Forty-seven Lehigh Valley conductors have sued the Order of Railway Conductors for about \$12,000, which it is claimed they were to be paid while out of work, in consequence of the strike on that road last year. The defendant has confessed judgment by default.

Frank Orbin and J. T. Bibb, composing the Tacoma Grain Co., have purchased of the receiver of the Northern Pacific Elevator Co. the 39 grain elevators belonging to the Northern Pacific Railroad in the Northwest. These elevators last year shipped 2,900,000 cents of wheat.

The buildings of the stock yards at Jersey City, N. J., between the Erie and Pennsylvania stations, the largest establishment of the kind in the country except one, were destroyed by fire on June 16, and the total loss is about \$1,000,000. Over 5,000 live sheep were burned up in the fire. A large cattle boat was burned to the water's edge, and part of a Pennsylvania Railroad coal trestle was destroyed.

The *Tribune*, of North Enid, Okla., pronounces false the report of a bloody fight between brakemen and sheriffs in that town, which was widely published on May 22, and briefly referred to in the *Railroad Gazette* of June 1. There was no fight between the trainmen and the officers; no one was hit with a coupling pin; no one was killed; no officers were beaten or ejected from the train. One or two trainmen were arrested for violating the speed ordinance.

The arbitrators who were selected to settle wages of certain employees of the Mobile & Ohio, on the division terminating in St. Louis, decided that there should be a reduction of 4 per cent. for four months, the regular rates to be restored at the end of that time, and thenceforth continued, except on 60 days' notice from the discontented party. The railroad company at once announced that employees in other departments, and those in the

same departments south of the Ohio river, who had accepted a reduction of 8 per cent., should be paid on the same basis as those to whom this decision referred. In other words, the reduction throughout the lines of the company will be only 4 per cent.

The Northern Pacific resumed running through trains to Portland, Or., on June 14, the flood of three weeks ago having finally subsided sufficiently to permit partial repairs to the road. No detailed report of the damage has yet been published, but the officers of the Northern Pacific say that no important structures were lost, though the breaks in embankments and the damage to ballast from overflow were very serious, though still far less so than on the Union Pacific. The damage on the Northern Pacific was between Kelso and Portland, on the Columbia river, and between Missoula and Spokane. The Great Northern ran trains through from Leavenworth, Wash., to Seattle on June 11 for the first time since May 24. The excursionists over the Canadian Pacific, who were detained in the Rocky Mountains about a week, resumed their journey on June 13, though it does not appear how fully the track is restored. A newspaper correspondent, named S. R. Robb, has been arrested and is on trial at Vancouver for publishing the report that this excursion train had been wrecked, killing 40 passengers. The Union Pacific resumed trains between Tekoa, Wash., and Wallace, Id., on June 12, the line having been blocked two weeks. The line between Umatilla and Portland was still under water at last accounts, and the damage is even worse than appeared from the accounts printed a week ago. The Post Office Department at Washington announced on June 17 that the Great Northern would be in condition to resume through train service in about two weeks.

Tramps are still active in several places. A company of about 400 seized a freight train of the Union Pacific, Denver & Gulf, at La Salle, Col., on June 12, and ran it to Julesburg, but the people of that place organized a vigilance committee, and the tramps were driven off the cars. They hung around the town, however, and seized a Union Pacific train on June 14, but they accidentally derailed the engine and gave up the job. The railroad company then ran freight trains through without stopping, and placed guards on all the passenger trains. A band of 50 tramps seized a train of the Louisville, Evansville & St. Louis on June 13, and a band of 100 is reported to have stolen a train at Dawson, N. D., June 15. On June 16 ten men who made trouble at North Platte, Neb., were arrested and held for trial at Omaha. At Los Angeles, Cal., on June 13, Judge Ross, of the United States Court, sentenced 170 Coxeyites to jail for four months. A band who were unable to get on to freight trains at Bismarck, N. D., fitted up some hand cars with long platforms and traveled some distance, but had to give up the job and run away.

The striking coal miners have slowly acquiesced in the compromise which their leaders made with the operators at Columbus on June 11, and the coal famine is relieved at all points, though shipments from the mines that have been idle can hardly be said to have been restored with much regularity, as yet. The movement of coal from West Virginia through Ohio was restored by the middle of last week, and continues heavy. Violence continued in Ohio at a number of places after the agreement at Columbus was made. Two bridges were burned on the Wheeling & Lake Erie on Wednesday. Miners fired upon the militia near Beach City, O., on Thursday, and a railroad bridge was burned near Elkhorn, Pa., on the same day. Obstructions were placed upon the track of the Baltimore & Ohio, at Scottdale, Pa., with the hope of derailing a train bringing non-union men to work at the coke ovens. A trestle of the Pittsburgh & Lake Erie, near Monongahela City, was burned on June 14. At Greensburg, Pa., a mob of 800 strikers stopped the movement of coal trains on a branch of the Pennsylvania Road and partly destroyed a bridge. The Toledo & Ohio Central has restored the wages of its employees, which were reduced 33 1/3 per cent. soon after the strike began.

#### Ohio Corporation Tax Law.

The decision of the Supreme Court of the United States on the Massie law of Ohio was recently announced at Washington, D. C., the Court sustaining the law as entirely constitutional. The Massie law requires railroads and other corporations, both foreign and those of Ohio origin, to pay one-tenth of one per cent. of their capital stock as a tax for incorporating under the laws of Ohio, and all companies are required to incorporate before they can do business in the State. About \$230,000 had been paid into the Ohio State Treasury under protest before this decision was rendered, and the corporations were hopeful that the United States Supreme Court would declare the law unconstitutional, as in that event the money, which had been paid under protest, could be recovered by suing the State under a special statute passed for that purpose. The records of the State of Ohio show that different railroads were interested in the Supreme Court decision to the following extent (being the amount they had paid for incorporation taxes): Columbus, Sandusky & Hocking, about \$10,000; Marietta, Hocking & Northern, \$100; Pittsburgh, Akron & Western, \$4,230; Pittsburgh, Cincinnati, Chicago & St. Louis, \$75,000; Scioto Valley & New England, \$5,000; Cincinnati, Jackson & Mackinaw, \$16,300; Pittsburgh, Shenango & Lake Erie, \$7,800; Kanawha & Michigan, \$10,000; Wabash, \$52,000; Baltimore & Ohio Southwestern, \$30,000. Thus, of the total of \$230,000 paid in under the Massie law, the railroads have paid \$210,430. Of this sum Inter-State consolidations paid \$191,000. Roads like the Wabash had claimed that Ohio could collect tax only on such proportion of the capital as represented mileage in Ohio but this point was overruled.

#### A Bridge Over the Hudson.

The New York *Tribune* says that "the North River Bridge is now free from legislative obstacles, and work on it will speedily begin. Its masonry will revive the



marvels of Egypt, and its superstructure will be by far the grandest and most imposing fabric of like sort in the world, only approached, indeed, by the great bridge across the Forth in Scotland, which fell down a few years ago with great loss of life and was reconstructed on better engineering principles. It will take the place of the Brooklyn Bridge as the chief pontine ornament of the metropolis and the world, and in its utilities will surpass any structure of like kind ever built. It will contribute to the convenience and shorten the journeys of a greater number of people than any causeway of the old or modern period, or than any likely to be built for some generations to come, unless it should finally be determined to bridge the British Channel, as has been proposed, and even then it is likely that the New York structure would carry the greater number of passengers."

In all of which the elegance of the young man's language is only equalled by his ignorance. He means the New York and New Jersey Bridge, and not the North River, the North River being a specific name for the Lindenthal enterprise. There is no record of any great bridge crossing the Forth ever having fallen down—of course, he means the Tay Bridge. The assumption that "the bridge will shorten the journeys of a greater number of people, etc.," is a very bold one indeed.

#### A Strictly Non-Compound Locomotive.

Sunday afternoon the pony truck axle on the one engine which the Jacksonville, Mayport & Pablo railroad boasts, broke, eight miles from Jacksonville, and a number of the passengers had to foot it to town. For two weeks past the engine has been run one-sided, or with one cylinder. It was unable to develop sufficient power to pull a coach, so a flat-car and an unobstructed view of the scenery was what the passengers had to enjoy. On the flat-car was placed a hand-car. The hand-car was there for the same reason that a lifeboat is on the deck of a ship—to provide for accidents. When the axle broke, the hand-car had to be launched. There were only two ladies on board the flat-car, and, of course, theirs was the privilege of riding on the hand-car, instead of walking the eight miles to town, which was the lot of the less fortunate male passengers. A mile up the track the hand-car ran off, and the ladies were thrown in the air, but landed in soft places and were unhurt. The same accident happened three times, but they got to Jacksonville uninjured and are rather proud of their adventure than otherwise. The new engine which Receiver Marvin has ordered for the road is expected daily.—*Jacksonville (Fla.) Times-Union.*

#### Shipbuilding in the United States.

The records of the Bureau of Navigation show that during the first three-quarters of the present fiscal year there were built in the United States 339 wooden sailing vessels, of 24,271 tons, and 221 wooden steam vessels, of 29,948 tons. During the same period 3 iron or steel sailing vessels were built, of 4,749 tons, and 27 iron or steel steam vessels, of 26,920 tons. These sailing vessels aggregated 342 in number and 29,021 tons in measurement. The steam vessels aggregated 248 in number and measured 56,869 tons. The entire number of vessels built and numbered was 590, the tonnage being 85,890.

#### Bonds Listed at the New York Stock Exchange.

The Governing Committee of the New York Stock Exchange has added to the lists for dealings \$9,284,000 of new stock and bonds, as below:—

Delaware & Hudson Canal Co., \$5,000,000 additional capital stock to be added October 1, 1894, in exchange for bonds maturing at that date; total amount of stock, \$35,000,000.

Buffalo & Susquehanna, \$900,000 first mortgage 5 per cent. bonds.

Chicago, Rock Island & Pacific, \$1,500,000 additional debenture coupon 5's of 1921; total amount listed, \$4,500,000.

Cleveland, Cincinnati, Chicago & St. Louis, \$2,000,000 additional general mortgage 4's of 1893; total amount listed, \$5,000,000.

Florida Central & Peninsular, \$4,500,000 new cumulative 4 per cent. preferred stock as it may be exchanged for like amount of outstanding 5 per cent. non-cumulative preferred stock.

Chicago, Milwaukee & St. Paul, \$3,000,000 additional general mortgage guaranteed 4's; total amount listed, \$17,800,000.

New York, Brooklyn & Manhattan Beach, \$245,000 first consolidated mortgage 5's of 1935; total amount listed, \$1,178,000.

New Orleans & Northeastern, \$40,000 additional prior lien gold 6's of 1915; total amount listed, \$1,320,000.

Toledo & Ohio Central, \$199,000 additional Western division first mortgage 5's of 1990; amount listed, \$2,500,000.

#### LOCOMOTIVE BUILDING.

The Cincinnati, Lebanon & Northern has recently ordered several standard gage locomotives from the Baldwin Locomotive Works.

The Baldwin Locomotive Works have received an order from the Missouri, Kansas & Texas, for five consolidation freight locomotives. The company asked bids on ten engines, but it has been decided not to order more than five for the present.

The Lehigh Valley has recently ordered three heavy locomotives from the Schenectady Locomotive Works. The railroad company has recently purchased from the Delaware, Susquehanna & Schuylkill five or six of the very heavy locomotives built for that company last year, which it will use on the mountain sections of the railroad. The new engines ordered from Schenectady are to be similar in most respects to these engines.

#### CAR BUILDING.

The Lehigh Valley road is asking bids for 2,000 coal cars.

The Cuban order of the Youngstown Car Works, recently noted, is for 150 platform and 30 tank cars for use on the sugar plantation railroads in Cuba.

The shops of the Madison Car Co. will probably be opened in July, under an agreement with the creditors, who have accepted the settlement proposed by the company's officers.

#### BRIDGE BUILDING.

Aitkin, Minn.—A meeting between the citizens and the county commissioners was held at Aitkin on June 11, and a contract was made between the county commissioners and citizens of Aitkin by which the latter are to build a bridge across the Mississippi at this point within one year from date. The county is to pay for it after completion.

Altoona, Pa.—Viewers have been appointed for a county bridge over Sinking Valley Creek, on the line of Blair and Cambria Counties.

Beaumont, Tex.—The Texas & New Orleans, one of the subsidiary roads of the Southern Pacific is now erecting an iron drawbridge across the Neches river at Beaumont. The masonry work for the piers has been finished. The new structure will replace an old wooden bridge, and will be completed during July.

Bethlehem, Pa.—On June 12 the Commissioners of Lehigh and Northampton Counties opened the following bids to repair the Broad street Bridge at Bethlehem, the bids being divided in two parts, one calling for the repairs without obstruction to travel, and the other permitting obstruction to travel: Penn Bridge Co., Beaver Falls, prohibiting travel, \$11,947; without prohibiting travel, \$12,900; Wrought Iron Bridge Co., Canton, O., 1st, \$10,900; 2d, \$11,200; Pottsville Bridge Co., No. 1, \$8,000; No. 2, \$7,550, travel stopped; \$8,500, travel not stopped; Nelson & Buchanan, with travel, \$12,000; no travel, \$10,800; Variety Iron Works Co., new bridge, \$6,685; with travel, \$7,000; without travel, \$6,740; floor and joists, \$1,500; Owego Bridge Co., Plan A, \$9,500; new bridge complete, \$14,000; Lehigh Valley Construction Co., Plan A, \$6,002; Plan B, \$5,805. June 15 the contract was awarded to the Variety Iron Works. The Lehigh Valley Traction Co., whose tracks cross the bridge, will pay one-fourth of the cost.

Cambridge, Md.—The following bids have been submitted for the construction of the proposed iron drawbridge over the Cambridge River, at Cambridge, for the superstructure: Toledo Bridge Co., \$4,299; Groton Bridge & Mfg. Co., \$4,840; King Bridge Co., \$4,590; Youngstown Bridge Co., \$4,743; Delaware Construction Co., \$6,630; Wrought Iron Bridge Co., \$5,900. For the substructure: Benjamin Glenn, \$5,844; Andrew Brown, \$5,408; Delaware Construction Co., \$4,975. The bridge will be 137 ft. long, with a draw span of 100 ft. There will be a carriage way 16 ft. wide, with a footway on each side 5 ft. wide. The specifications were prepared by Engineer Charles H. Latrobe, of Baltimore. The cost will be about \$10,000, and it is expected that the bridge will be finished in September.

Cambridge, O.—The Guernsey County Commissioners will receive proposals on July 12 for the construction of an iron bridge over Wills Creek. The bridge is to be one span, 160 ft. in length, with a roadway of 14 ft.

Columbus, O.—County Engineer Dun has informed the County Commissioners that the old bridge over Alum Creek, at Main street, ought to be replaced. The present bridge has stood for 13 years, but a lack of funds may prevent the immediate building of a new bridge.

Denver, Col.—The State Engineer has been authorized to advertise for bids for the construction of the Yampa River Bridge. The bridge will cost about \$5,000.

El Paso, Tex.—The new steel bridge of the Southern Pacific crossing the Rio Grande at El Paso, will not be completed for three months longer. The masonry work is practically finished but the erection of steel superstructure is not yet begun. The bridge is over 1,000 feet long and is being built by the Phoenix Bridge Co.

Etobicoke, Ont.—Tenders are invited for the construction of two pile abutments for the new steel bridge over Mimico Creek, on the Lake Shore Road.

Harper's Ferry, W. Va.—A charter was secured in West Virginia last week for the Harper's Ferry & Potomac Bridge Co., of Charlestown, W. Va., with \$50,000 capital, to build a highway bridge over the Potomac river, near Harper's Ferry. The incorporators are George Baylor, Daniel B. Lucas, A. W. McDonald and Forest W. Brown, of Charlestown, and E. B. Chambers, of Harper's Ferry, W. Va.

Harrisburg, Pa.—The Grand Jury on June 16 recommended the erection of a foot bridge over the Pennsylvania tracks at Market street and an overhead or underground passageway at Herr street. Dangerous grade crossings now exist at both these places.

Hastings, Minn.—Proposals will be received until July 2 for the construction of a \$40,000 highway bridge across the Mississippi river. Proposals should be addressed to Irving Todd, Jr., City Clerk. Clausen & Bonwell, of St. Paul, are the consulting engineers for this bridge.

Huntingdon, Pa.—The County Commissioners have let the contracts for repairing the Mapleton and Mill Creek bridges over the Juniata river to the Groton Bridge Co., of Groton, N. Y., for \$7,765. On the Mapleton Bridge one span of 190 ft. will be new. The bridges are to be finished by Sept. 15. The Mill Creek and Mapleton bridges, built in 1889, cost the county \$16,800. The Groton Bridge Co. has also received contracts for building the McVeytown and Bedford bridges.

Johnstown, Pa.—Of the 14 bidders for the superstructure of the new iron county bridges at Elton, Adams Township, Nantyglow, Blacklick Township, and Spangler, the Massillon Bridge Co. was the lowest on all three, and was given the contract at the following prices: Elton Bridge, \$1,488; Nantyglow, \$1,407, and Spangler at \$440.

If the Johnstown Passenger Railway Co. will assist, a bridge will likely be built across the Conemaugh river, at the upper end of Maple avenue, to replace the one swept away in the flood of 1889. It will cost about \$14,000, and do away with a dangerous grade crossing over the Pennsylvania tracks.

Lansing, Mich.—A special city election was held in Lansing, Mich., and it was voted to issue \$100,000 in city bonds for improvements. About \$25,000 of this sum will be used in the erection of the new bridge across Grand river, on Michigan avenue.

Marion, Ind.—Proposals will be received until June 30 for a wrought iron or steel bridge over Mississinewa river, at Washington street, to be built by the Grant County Commissioners.

Montreal.—Chief Engineer P. A. Peterson, of the Canadian Pacific Railroad, in talking to a newspaper reporter about the improvements on the railroad, mentions that the new steel bridges known as the Stoney Creek and Salmon river bridges are nearly completed. The Stoney Creek bridge is near the summit of the Selkirk, about 2,480 miles from Montreal; the structure is 300 feet high, and has a span of 330 feet. It replaces a wooden bridge which was in excellent condition, but which it was decided to replace on account of the danger from fire and the interruption to traffic which its destruction would cause. The Salmon river bridge is about 2,770 miles from Montreal, and has cost about \$50,000 to erect; the Salmon Creek structure costing about twice that amount.

Philadelphia.—President Cleveland has approved the act authorizing the Pennsylvania & New Jersey Railroad

to construct a bridge over the Delaware River at Philadelphia. It provides that the structure shall clear high water by 40 ft.; the channel span shall be 500 feet long, and the draw span shall give a clear opening of 125 ft. This Company has been organized by officers of the Pennsylvania Railroad.

Providence, R. I.—The State has appropriated \$40,000 as part of the cost to the city in replacing the present Central Bridge over the Blackstone river, between the city and East Providence, by an iron or steel structure upon the same draw pier and abutments.

Red Wing, Minn.—Tenders have been invited for the construction of the steel superstructure of the high wagon bridge across the Mississippi river at this point. The bridge will be a four-span steel structure, with steel trestle approaches at either end. There will be two spans 94 ft. each, one 220 ft., and one 430 ft., making a total length, including steel trestle approaches, of nearly 1,000 feet. D. D. Smith, of St. Paul, who has the contract for the substructure, has the work well under way, and will complete it about Oct. 1. The tenders for the superstructure will be opened on July 13, and the bridge is to be completed by Jan. 1, 1895. C. F. Loweth, C. E., of St. Paul, Minn., is the engineer in charge.

Slatington, Pa.—A new inter-county bridge will shortly be built at Slatington, the old bridge having been declared unsafe.

Sioux City, Ia.—The Credits Commutation Co. has presented to the City Council the petition of freeholders for the election to vote a tax of \$400,000 to aid in constructing the unfinished bridge across the Missouri River at this point. The signatures of about two-thirds of the freeholders have been received. The company agrees to begin work by August 1 if the tax is voted.

Sunbury, Pa.—The Philadelphia & Erie has agreed to build an overhead foot bridge at Packer street if that street is abandoned by the city.

Topeka, Kan.—The City Council has been asked by a number of business men of the city to authorize the construction of a new bridge across the Kansas river on Kansas avenue. The new structure is to replace the present bridge, which had been condemned as unsafe. The City Council has taken no action on the petition, but it is thought it will not be willing to authorize the expenditure proposed at the present time.

Van Buren, Ark.—The Van Buren-Arkansas Bridge Co., has been incorporated by W. W. Rheele, R. G. Hunt, H. C. Meechem, Robert S. Hines, J. L. Lea and W. E. Hover. The object of the company is to construct and operate a wagon and railroad bridge over the Arkansas river at Van Buren. H. C. Meechem is President of the company.

Warren, O.—Proposals will be received until July 1 for plans and estimates for a highway bridge over Mahoning river, at South street, to be built by the city.

Williamsport, Pa.—Some 25 bids were received by the County Commissioners for the new bridges to be erected by the county, as noted in these columns. On the Muncie bridge the prices were from \$24,000 to \$28,000. On the Jersey Shore bridges, from \$15,000 to \$18,000, and on the Perryville and Fields bridges, from \$10,300 to \$12,000.

Williamstown, Pa.—Viewers have been appointed for the erection of a bridge over Wiconisco Creek between Williams suburb and Williamstown.

Winnipeg, Man.—Sealed tenders, addressed to J. C. Sproule, Chairman Committee on Work, for the construction and erection of an iron or wooden superstructure for Maryland street bridge, will be received up to July 12. Plans and specifications can be seen and forms of tender obtained on application to the City Engineer.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Canadian Pacific, semi-annual, 2½ per cent. on the common stock, payable Aug. 17.

Chicago, St. Paul, Minneapolis & Omaha, semi-annual, 3½ per cent. on the preferred stock, payable Aug. 20.

Columbus, Hocking Valley & Toledo, 2½ per cent. on the preferred stock, payable July 2.

Fitchburg, semi-annual, 1 per cent.

Norfolk & Southern, quarterly, 1 per cent. payable July 10.

Northern Central, 3 per cent. payable July 16.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Hancock & Calumet, annual, Hancock, Mich., July 10.

Marquette, Houghton & Ontonagon, annual, Marquette, Mich., July 19.

Mineral Range, annual, Hancock, Mich., July 10.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Western Railway Club meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York city, on the third Thursday in each month, at 8 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October.

The Southern and Southwestern Railway Club meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The Northwestern Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The annual convention will be held at the Cataract House, Niagara Falls, N. Y., beginning June 20.

The Western Society of Engineers meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.



The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

#### Yardmasters' Association.

The Railway Yardmasters' Association, at its recent convention at Peoria, Ill., elected the following officers: W. E. Bell, of Peoria, President; D. E. Clark, of West Superior, Vice-President; J. W. Conneys, of Cincinnati, Secretary and Treasurer. Denver was selected as the next place of meeting.

#### American Society of Civil Engineers.

The Summer convention of the American Society of Civil Engineers began at Niagara Falls on Wednesday morning. A special train over the Lehigh Valley left New York at 8.30, Tuesday morning, carrying a large number of people, and others joined the train on the way. Cars were run from Philadelphia, joining the special train at Bethlehem. It is expected that the attendance will be unusually large and the programme fills the entire week.

#### Iron and Steel Institute.

The Autumn meeting of the Iron and Steel Institute (British) will be held in Brussels, and will commence on Monday, August 20. The arrangements are being organized by a local reception committee, of which Mr. Gillon, President of the Society of Engineers of Liège, is the Chairman; Mr. Briart, President of the Society of Engineers of Hainaut, the Vice-Chairman, and Mr. E. Coppée, of Brussels, and Professor A. Habets, of Liège, the Honorary Secretaries.

#### American Association for the Advancement of Science.

The forty-third meeting of this Association will be held in Brooklyn, N. Y., August 16 to August 23. Section D, Mechanical Science and Engineering, Mansfield Merriam, Vice-President, will meet for organization the morning of August 16, immediately after conclusion of the general session. The address of the Vice-President, "The Resistance of Materials Under Impact," will be delivered at 4.30 on that day. It is expected that papers and discussions in Section D will occupy the 17th, 18th and part of the 20th. The meeting of the Society for the Promotion of Engineering Education will begin, under the auspices of this Section, August 20.

#### National Association of Local Freight Agents.

This Association met in Detroit on June 12, 13 and 14. The following officers were elected for the ensuing year: President, E. E. Zeigler, Buffalo; Vice-President, William Smith, New York; Secretary, Lot Brown, Chicago; Treasurer, C. H. Newton, Fort Wayne.

#### Railway Carmen's Union.

This Association held its annual meeting in Chicago last week. J. B. Stevenson, of East St. Louis, was elected "Chief Carman," and F. L. Romemus, of Estherville, Ia., Secretary.

#### Train Despatchers' Association.

The seventh annual convention of the Train Despatchers' Association met in Chicago on June 12, about 30 members being present. The principal business was the repealing of those clauses of the constitution which provide for protection; in other words, which countenance striking. The vote in favor of repeal was unanimous.

The membership of the Association is now 422, an increase of 147 during the past year. The Chairman of the Train Rule Committee reported that he had been unable to get the Committee together during the year and no report was made. It was ordered that the *Railway Age* should no longer be sent to the members free, though they can get it at \$3 a year through the Secretary. The Association guarantees 100 subscriptions to that paper. The next annual meeting will be held in Minneapolis.

The election of officers for the ensuing year resulted as follows: President, A. F. Vick Roy (U. P.), Denver; Vice-President, J. G. Sickles (C. R. I. & P.), Blue Island, Ill.; Secretary and Treasurer and Editor, J. F. Mackie (C. R. I. & P.), Chicago, Ill.

#### The Engineers' Club of Philadelphia.

The last meeting of the club before the Summer recess, was on June 16, at 8 o'clock p. m. A paper on "The Engineering Features of the Harrison Building," with lantern illuminations, by W. C. Furber, was read.

#### THE JOHNSTOWN FLOOD OF 1889.

Mr. Joseph T. Richards described the rebuilding the Pennsylvania Railroad after the June flood of 1889. He

prefaced his remarks on the engineering features of the subject by describing the trip of inspection which he had made in company with Mr. Frank Thomson, of the Pennsylvania Railroad, on June 1, to examine the extent of the damage that had been done by the storm of the previous days, and to make arrangements for repairing it. They had gone by the main line as far as Harrisburg, and thence over the Northern Central and the Philadelphia & Erie Railroads to Williamsport, Lock Haven, Tyrone, South Fork and Johnstown. The rainfall during a period of 24 to 30 hours, over the entire State, had amounted to from 4 to 8 inches in low places, and was, undoubtedly, greater on the high lands. When Harrisburg was reached, it was found that much damage had been done to all parts of the road which were near the waterways, although communication with other places was very difficult, as most of the telegraph wires were down. A train was at once prepared, with cars containing food and kitchen supplies and materials for track repairing, including several carloads of 3-inch plank, which experience had proven to be about the best sort of lumber for use in temporary construction. The party's first work was to go to the relief of a passenger train which was laid up between Harrisburg and Steelton. The train had to be abandoned, however, and the passengers were reached and taken off in a boat. It was found that six miles of track east from Harrisburg was entirely under water, and that the railroad bridge was gone. While waiting for the water to subside, the time was spent in preparing wooden Howe trusses for a temporary bridge. In placing these latter, great difficulty was experienced in arranging the supports, on account of the very uneven bottom of the stream. Work was fully under way by June 5, and, when finished, the bridge had a total length of 1,242 feet in eight spans. This work had been done at the rate of about 300 feet per day under very great difficulties in transporting and handling material. The loss in the Conemaugh Valley amounted to over 20 miles of main-line track, beside a very large amount of rolling stock.

Mr. Richards illustrated his remarks by reference to a large map of the territory, general maps of the State, cross sections of the bed of the Conemaugh river, etc., and at the close explained a large series of photographic views projected by the lantern.

He also pointed out the fact that the flood in the valley had averaged 27 feet in depth above mean low water, and as it was considerably deeper than this in other localities without doing serious damage, he believed that the principal cause of the immense loss in the Conemaugh was due to the fact that the bed of the stream fell at a rate of about 53 feet per mile, and that when the South Fork dam broke, the velocity of nearly 21,000,000 tons of water which it contained was simply irresistible.

#### PERSONAL.

—Mr. J. Van Dell has been appointed to succeed Mr. J. D. McIlwain as superintendent of the Harvey Steel Car Works, at Harvey, Ill.

—Mr. L. S. Coffin, of Fort Dodge, Ia., has formally announced himself as a candidate for the Republican nomination for Railroad Commissioner of Iowa.

—Mr. Charles W. Mead died in Los Angeles, Cal., on June 14, from dropsy. He was at different times Superintendent of the Union Pacific system, of the Hannibal & St. Joseph road.

—Mr. Joseph Sielski, formerly with the International & Great Northern, has been appointed Auditor of the Cartagena & Magdalena Railroad in the United States of Colombia.

—Mr. James Bruce, who recently resigned as Superintendent of the Pittsburg division of the Buffalo, Rochester & Pittsburg, has withdrawn his resignation and has resumed the duties of that position.

—Mr. D. L. Harkness, State Dairy and Food Commissioner of Wisconsin, and a former Superintendent of the northern division of the Chicago, Milwaukee & St. Paul Railroad, died at Berlin, Wis., on June 11.

—Mr. Joseph M. Wilson, C. E., of Philadelphia, delivered the address before the graduating class of the Rensselaer Polytechnic Institute at Troy, N. Y., June 13. Mr. Wilson is a graduate of the Class of '58 of that institution.

—Mr. R. J. Gross, Vice-President of the Brooks Locomotive Works, and Mr. H. Tandy, Assistant Superintendent of those works, arrived in London on June 13 on their way to Rio de Janeiro. Their trip to Brazil is undertaken to study the special features for 60 locomotives for the Central of Brazil Railroad, recently awarded to the Brooks Locomotive Works.

—Mr. E. A. Cheney has been appointed Purchasing Agent of the Buffalo & Susquehanna, in Pennsylvania, with office at Austin, Pa. This department was formerly in charge of Mr. E. C. Underhill, the General Freight and Passenger Agent, who has been compelled to relinquish the position on account of increase of his duties which has come since the various sections of the road were united, and the through traffic developed. Mr. Cheney has been the Auditor of the railroad and will continue in that office.

—Mr. O. H. Taylor, who has been Assistant General Passenger Agent of the Old Colony Steamboat Co., with office at New York city, has been appointed General Passenger Agent of that company, which operates the Fall River Line of steamers, his office remaining at New York City. The former General Passenger Agent of that company was Mr. George L. Connor, who was appointed to that office in 1874. After the lease of the Old Colony Road to the New York, New Haven & Hartford, Mr. Connor became Passenger Traffic Manager of that railroad, and also of the Providence & Stonington Line Steamship Co., though continuing to hold the office of General Passenger Agent of the Fall River Line until very recently, when he was also appointed Passenger Traffic Manager of that company, with headquarters at New Haven, Conn.

—Sir Edward Watkin, Chairman of the South Eastern, the Manchester, Sheffield & Lancashire, the Metropolitan and other railroad companies and undertakings, has retired from active work, but *The Economist* thinks that no great changes are likely to take place as a consequence. The Sheffield will doubtless push on as fast as its means will allow, with its extension to London, and the Metropolitan, which has ceased to quarrel violently with the District, may be expected to pursue the even tenor of its ways. Probably a greater spirit of peace will prevail as regards the relations of the South Eastern with the London, Chatham & Dover. Sir Edward Watkin has long been a strange and interesting figure in the English railroad world, a very aggressive man, very speculative, and with little tact. He has contrived to occupy a good deal of public attention with schemes of little value, and to make for himself a good many enemies. On the other hand he has probably been a useful man in stimulating enterprise.

—Mr. Duncan McIntyre, of Montreal, who became well-known through his prominent connection with the financing and building of the Canadian Pacific Railroad, died at his home in Montreal, on June 13. Mr. McIntyre was born in Scotland, but had lived most of his life in Canada, where he engaged in business and acquired wealth and prominence. He became best known, however, through his railroad interests, being one of the incorporators of the Canadian Pacific Railroad, together with Lord Mount Stephen, R. S. Kennedy, R. B. Angus, Sir Donald A. Smith, and others. Before the Canadian Pacific was formed Mr. McIntyre had been interested in the Brockville & Ottawa Railroad, and was the dominating spirit in its management. He was also interested in the Canada Central and became its President until the lease of the road to the Canadian Pacific, in 1881. He assumed a large financial responsibility in the construction of the Canadian Pacific, and was a director of that company, and interested in its financial management for many years. He retired a few years ago, and some time afterward was elected a director of the Grand Trunk Railroad. He leaves a fortune estimated at five million dollars.

#### ELECTIONS AND APPOINTMENTS.

*Butte, Anaconda & Pacific.*—C. A. Swineford has been appointed Superintendent, with headquarters at Anaconda, Mon., to succeed G. F. Copeland, resigned.

*Cleveland, Akron & Columbus.*—H. D. Grahame, Traveling Passenger Agent, having resigned to accept other service, J. P. Minnick has been appointed Traveling Passenger Agent, with headquarters at the Society for Savings Building, Cleveland, O.

*Duluth & Iron Range.*—The annual election resulted as follows: Officers, H. H. Porter, Chairman; J. L. Great-singer, President; C. W. Hilliard and Joseph Smallwood, Vice-Presidents; C. W. Hilliard, Secretary and Treasurer. Directors, in addition to the above: Marshall Field, Benjamin Brewster, Lazarus Silverman, D. O. Mills, J. H. Chandler, C. P. Coffin, C. Tower, H. M. Flagler, P. H. Kelly.

*Elgin, Joliet & Eastern.*—J. F. Sechler has been appointed Master Mechanic, with headquarters at Joliet, Ill., to succeed Thomas Downing, resigned. He will have charge of the motive power and rolling stock.

*Erie & Wyoming Valley.*—C. W. Bogart, formerly Assistant General Foreman of the car shops of the New York, Lake Erie & Western, at Port Jervis, N. Y., has been appointed General Foreman at this company's shops at Dunmore, Pa.

*Jacksonville, Louisville & St. Louis.*—The following appointments have been announced by C. M. Stanton, General Manager: B. F. Bond, to be Engineer Maintenance of Way, and John Foulk, to be General Foreman of Rolling Stock, with offices at Jacksonville, Ill.

*Lehigh & Eastern.*—At a meeting at Stroudsburg, Pa., on June 18, of those interested in the proposed railroad, the following officers and directors were elected: President, S. H. Nichols, of Philadelphia; Secretary, Liddon Flick, of Wilkesbarre; Board of Directors, J. R. Perry, George Smith, J. B. Shaffer and Liddon Flick, of Wilkesbarre.

*Mexican Central.*—M. S. McCay, Superintendent of the San Luis division, with headquarters at San Luis Potosi, Mex., has resigned. James H. Kain, Chief Engineer, has resigned, the resignation to take effect Sept. 30, and the office formerly held by him will be abolished.

*Monongahela & Allegheny.*—The Directors of this new Pennsylvania company are: President, G. T. Richards, of Pittsburg; James Daig, L. H. Partridge, James Duncan, Jr., William Smith, C. H. Sackridge and R. S. Frazer, all of Pittsburg.

*Monterey & Mexican Gulf.*—J. O. Rice has been appointed Auditor, with headquarters at Monterey, Mex., to succeed J. P. Flynn.

*Pennsylvania Midland.*—The officers and Directors of the company are as follows: Hon. George B. Orady, of Huntingdon, Pa., President, S. J. Spyker, Huntingdon, Secretary; W. Grant Wilson, Harrisburg, Pa., Treasurer. C. P. Dull, McVeytown; F. J. Kooser, Somerset; Harry Cessna, Bedford, Pa.; G. B. Orady, Huntingdon; W. I. Woodcock, Hollidaysburg; Theodore Gerrish and J. J. Gerrish, Castine, Me.; John Norwood, Paterson, N. J.; G. M. Warren, Castine, Me., are Directors, and J. Murray Africa, Huntingdon, Pa., Chief Engineer.

*Philadelphia Bell Line.*—At a meeting of the stockholders last week at the office of the company, Third and Walnut streets, Philadelphia, Francis B. Reeves was elected stockholders' member of the Board of Trustees of the company for one year, and Richard Y. Cook was elected representative member of the Board of Trustees for three years. William R. Tucker, Secretary of the Board of Trade, and Colonel C. Ross Smith, Secretary of the Commercial Exchange, jointly voted 51 per cent. of the stock of the company. These commercial bodies hold a majority of the stock in trust for the city of Philadelphia.

*Portland, Saco, & Portsmouth.*—The following directors were chosen by the stockholders at a recent meeting at Kittery, Me.: Samuel C. Lawrence, Medford, Mass.; Lucius Tuttle, Walter Hunnewell, William T. Hart, Geo. O. Carpenter, all of Boston; Daniel W. Lawrence, Medford, Mass., and F. R. Barrett, Portland, Me.

*Shore Line.*—At the annual meeting held at Machias, Me., the following directors were elected: J. N. Greene, L. G. Downes, Judson Clark, George M. Hanson, William M. Nesh, S. M. Campbell, Stephen Sherlock, Gen. B. B. Murray, E. B. Curtis, J. K. Ames, Austin Kingsley, Austin Harris, and S. D. Leavitt. J. N. Green was chosen President; L. G. Downes, Treasurer, and H. E. Hamlin, Clerk.

*Southern Railway Co.*—The organization of this company which is the successor of the Richmond & Danville was completed at a meeting in Richmond, Va., on June 18. The following officers were elected: Samuel Spencer, President; A. B. Andrews, Second Vice-president; W. H. Baldwin, Jr., Third Vice-President; Francis Lynde Stetson, General Counsel; W. C. Ewen, Secretary; John W. Hall, Treasurer; George S. Hobbs, Auditor. A permanent board of directors will be elected later. The general offices of the company will be located in Richmond, Va.

*Union Pacific, Denver & Gulf.*—Division Superintendent, J. K. Painter, of the Cheyenne & Northern Division has been succeeded by J. C. Sanders, who has been acting as trainmaster and conductor.

*Weatherford, Mineral Wells & Northwestern.*—The annual meeting of the stockholders and directors of the railroad was held at Weatherford, Tex., June 12. The old



directors were elected, and L. M. Fouts re-elected President and General Manager, and E. R. Standish, Auditor and Treasurer.

**Wiscasset & Quebec.**—At a special meeting of the Directors, at the company's office in Wiscasset, Me., occasioned by the serious illness of George H. Crosby, of Albion, President and General Manager, it was voted that should Mr. Crosby's illness continue, Hon. I. C. Libby, of Waterville, be selected as President, and A. F. Gerald, of Fairfield, as General Manager, pending which Capt. K. F. Rundlett will manage the affairs of the company for the Directors.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Arkansas Northwestern.**—This company has been chartered in Arkansas, with Joseph Hansen, H. M. Hansen, H. C. Hull, F. C. Parker, T. J. Porter, S. F. Staehl, L. H. McGuill, J. A. Rice, C. L. Robinson and J. M. Bohart as directors. The proposed road will be constructed from Bentonville, in Benton County, in a northwesterly direction about 25 miles, to a point on the State line between Arkansas and Missouri.

**Baltimore & Lehigh.**—This railroad is now controlled by the first mortgage bondholders of the company, and it is expected that they will soon complete the reorganization of the company, electing Mr. J. Wilson Brown, of Baltimore, President. Mr. Brown has been President of the Annapolis, Washington & Baltimore Railroad for some years. It is intended to make the line a standard gage railroad through from Baltimore to Delta, and to York, Pa., 80 miles. It is hoped that this change will be made by November, when the Baltimore Belt Line, with which it makes important connections, will be opened for traffic. The Pennsylvania section of the road north of Delta to York has not yet been sold, and the litigation may delay the plans for reorganizing and improving the property.

**Bangor & Aroostook.**—The contracts for the grading on the line north of Houlton, Me., are now mostly let, and the contractors will soon have 1,000 men at work on the section as stated last week. It is expected that trains will be running into Presque Isle by October. Twelve miles are already graded from Houlton. There are two important bridges to be constructed, one across the Meduxnekeag, near Houlton, and the other over the Aroostook river between Presque Isle and Caribou. The stone for abutments and piers will have to be taken from a quarry at Oakdale, below Houlton. The section of the road between Bangor and Houlton already in operation is doing a satisfactory business, heavier than was expected.

**Binghamton, Pennsylvania & Southern.**—The incorporation of this company in Pennsylvania, to build an extension of the Binghamton & State Line road, south of the New York State line, has already been noted. It is proposed to begin the survey for the new line about July 1, the work being in charge of A. K. Harvey, of Binghamton, N. Y., Chief Engineer of the New York road. The Pennsylvania section of the project will be 32 miles long, extending through the Wyalusing Valley to the town of Wyalusing, in Bradford County, a station on the Lehigh Valley near Towanda. Senator Edward O'Connor, of Binghamton, N. Y., is President of the Pennsylvania corporation.

**Binghamton & State Line.**—The sub-contracts for this road south of Binghamton, N. Y., are to be let within a few weeks. The chief contractor for the work is Erastus Ross, of Binghamton, N. Y. The road has been located by A. K. Harvey, of Binghamton, from that town south to the Pennsylvania State line at Monoghan's Four Corners via Rossview and Vestal Centre, 13½ miles. The Binghamton, Pennsylvania & Southern, recently chartered, will extend the line from Monoghan's to Wyalusing via St. Josephs, and villages on the middle branch of Wyalusing Creek. The estimated distance of the Pennsylvania section is 32 miles. The work to be done is about medium, averaging 12,000 to 15,000 yards per mile. There are no bridges, and but few trestles. One trestle 45 feet high will be the heaviest. The maximum curve is 10 degrees, and maximum grade, 2 per cent. E. E. Kattell of Binghamton, is President.

**Brainerd & Northern Minnesota.**—The Lumbermen's syndicate, of Minneapolis, which now owns this road, has awarded a contract for the construction of 42 miles of road to Foley Brothers & Guthrie, of St. Paul. This extension will leave the main line near Edward Lake, and extend in a general northwesterly direction to Leech Lake. This contract covers that part of the line to Ten Mile Lake, which is about ten miles southwest of Leech Lake. As soon as the remaining ten miles is permanently located, contracts will be awarded for its construction. Work has already been commenced, and the road is to be completed before Oct. 1. F. M. Kimball, of Brainerd, Minn., is Chief Engineer of the road, and has direct charge of this work.

**Brookline & Milford.**—Ward Brothers, of Kennebunk, Me., who have the contract for this railroad in New Hampshire, are now working to complete the grading and masonry. The road is about eight miles long from Brookline, N. H., the present headquarters of the Ward Brothers, north to Milford, N. H. The track will be laid by the Fitchburg Railroad which the new line connects with at Brookline.

**Canadian Roads.**—A company has made a proposition to the Dominion Government to construct a railroad 10 miles in length from Tuft's Cove, through Waverly gold district, to Windsor Junction, Nova Scotia. It is the intention of the company, if the subsidy is forthcoming, to proceed at once with the construction.

**Chicago, Paducah & Memphis.**—This railroad is being built by Johnston Brothers & Faught, of St. Elmo, from that town south to Paducah, Ky. The locating surveys were made this year from St. Elmo south to Marion, and the grading was immediately commenced by the contractors, who are largely interested in the railroad as the projectors of the scheme. Track connection has been made at St. Elmo with the Terre Haute & Indianapolis Road, and at Mt. Vernon with the Louisville & Nashville, and the construction material is now being delivered at both these towns. The section now building from St. Elmo to Mt. Vernon, Ill., is about 50 miles, and Marion is 40 miles south of Mt. Vernon. T. P. Read is Chief Engineer of the railroad.

**Chicago, Union City & Cincinnati.**—About 17 miles of the grading is reported completed by George W. Patchell, Secretary of the company, at Union City, Ind. This work is between Bluffton and Camden, Ind. The bridges are now being erected, and when they have been put in the track laying will be commenced at Bluffton. This work has been done by Bracey Brothers & McNair, of Chicago. They began work some months ago, but have been delayed by the connection at Bluffton.

**Cincinnati, Lebanon & Northern.**—For some years this road has had a third rail on part of its line out of Cincinnati. At present it extends to Blue Ash, O., about 12 miles north of Cincinnati. It is announced that the conversion of the entire road through to Lebanon, 29 miles, to standard gage, is to be made at once. Orders for locomotives and other new equipment have been given out.

**Colbert Shoals & Western Alabama.**—Application has been filed with the Secretary of the State of Alabama for a charter to build a railroad in North Alabama from the south bank of the Tennessee river in Colbert County, southwesterly to the Mississippi State line. The proposed road will connect with the Tennessee river near the Colbert Shoals canal, now under construction. The incorporators are E. Reynolds, Jr., Wynne, Neb.; C. W. Hammond, Louisville, Ky.; C. W. Shurin, R. A. Abernethy, Tusculum, Ala.; S. E. Phelps, Denver, Col.; T. N. Roulhair and J. H. Walton, Sheffield, Ala.

**Conestogo Valley.**—Amos E. F. Sweigart, of near Douglasville, Pa., who attempted to carry out a scheme of building a railroad from Kenney's Station, near Joanna, on the Wilmington & Northern, to Lancaster, a distance of about 30 miles, without making any provision for the cash required for its construction, is now in jail at Pottstown, charged with false pretence. The story is that upon the representation that \$120,000 worth of stock had been subscribed, of which \$60,000 had been paid, surveyors were engaged to locate the line, after which Sweigart employed 200 men. One mile of the road was graded between Kenney's Station and Goosetown, when operations were suspended.

**Corpus Christi & Brownsville.**—Nearly 40 miles of the railroad has been surveyed from Corpus Christi, Tex., south, and the work is being steadily pushed forward. Grading, according to the projectors, will commence within the next few weeks.

**Corsicana & Southeastern.**—The citizens of Corsicana, Tex., have subscribed \$90,000 toward the \$100,000 subscription to the first mortgage bonds of the proposed railroad from Corsicana to Buffalo via Fairfield. The promoter of the road is C. W. Coykendall, of St. Louis. The Commercial Club, of Corsicana, expects to complete the subscription asked by the projector within a few weeks.

**Denver & Western.**—Incorporated in Denver, Col., to build a mining railroad with several branches from Alice, on Silver Creek, Clear Creek county, to Central, Black Hawk, Denver and the northern boundary line of Colorado. The directors are Henry Paul, William M. Mitchell, Edward W. Williams, J. W. Hawk and W. O. McFarlane. This is a plan to open for cheap transportation the lively new mining camp of Yankee Hill.

**Duluth, Mississippi River & Northern.**—So far this season the company has graded 15 miles from the end of track to Hibbing, Minn., and will lay rails at once. The road now in operation is from Swan River, Minn., north about 28 miles, and is used chiefly for hauling logs. I. N. Gray, of Swan River, is Chief Engineer.

**Duluth & North Dakota.**—The proposed railroad from Thief River, west to Drayton, N. D., projected by D. W. Hines, of Cavalier, N. D., and briefly noted two weeks ago, has been organized under this name. Mr. Hines proposes to build a road about 40 miles long from the Thief River Valley northwest through St. Thomas and Cavalier, N. D. He states that the surveys will begin this month under the charge of Mr. Merryman, an engineer of St. Paul.

**Ebensburg & Black Lick.**—The first car of coal from the rich Black Lick region was taken to Ebensburg, Pa., on the new line on June 9 from the Wagner Mine. This mine is about eight miles down the line, which is now graded for 18 miles.

**Erie & Wyoming.**—The company's track has been extended from Gypsy Grove to Jessup, seven miles. The extension crosses much coal land belonging to the Pennsylvania Coal Co., and passes close to individual mines.

**Fort Harrison.**—Capt. Hoyt, in charge of the construction of Fort Harrison, near Helena, Mont., has opened the proposals for the construction of a branch railroad at the fort. Hugh Kirkendall, of Helena, being the lowest proposal. The proposals were as follows: F. Youngen, Minneapolis, \$10,950; A. D. Guy, Helena, \$10,109; John Brady, Helena, \$9,881; Thos. L. Greenough, Missoula, \$10,361; Green & Quinn, Helena, \$9,662; and H. Kirkendall, Helena, \$8,590.

**Fremont, Elkhorn & Missouri Valley.**—The branch railroad from Minnecola, S. D., to the Hay Creek coal fields is to be built at once, the contract for the construction of the first 20 miles having been let to C. D. Crouch. The tie contract for the same distance was let to Dan. Ferguson, of Deadwood, S. D.

**Gulf, Beaumont & Kansas City.**—At present about 25 miles of this railroad is being operated north of Beaumont, Tex., in the eastern part of the state, to the west bank of the Neches river. The line is graded beyond the river to the town of Buena, and as soon as the bridge crossing the river is ready for use the company will open the line to Buena, giving it an operated line of 40 miles. A good deal of the grading beyond the river has been done this year, but the bridge work has considerably delayed the company. The iron work for this bridge has been delivered and is now being erected. The contractors for the work now going on are Snyder Bros. of Beaumont. About July 1, further contracts will be let for building 25 miles of road through Jasper County, north of the Neches river. The survey for this section, which will bring the road to Jasper, in the north end of the county, has just been finished. A new engineering party is being organized to begin a survey from a point about 25 miles north of Beaumont, and to extend in a northwest direction toward Dallas, with Judge M. L. Lynch, of Beaumont, as Chief Engineer.

**Gulf & Interstate.**—The "moving spirits" in the Populist railroad, which began work near Galveston, Tex., a few weeks ago, have already begun to quarrel among themselves over the prospective profits of the project. The work now under way is on Bolivar Peninsula, opposite Galveston, and it is said that about 25 miles has been graded. The contractor for this work claimed that his interests in the proposed town sites along the railroad were not as large as he deemed he ought to have, and so insisted on changing the route of the railroad to go through land he had purchased. On this move, the officers of the railroad company secured a new charter for their railroad in Texas, and announced that they would continue building along the surveyed route and would not acknowledge the claim of Contractor C. J. Jones to own the section already completed. Since then the rival railroad builders have come to some kind of an agreement, and they assure the public that the work is to continue without further difficulties.

**Harlan, Sioux City & Northern.**—This company has been incorporated in Iowa to build a railroad from Harlan, Shelby County, in the western part of Iowa, northwest to Sioux City, a distance of about 80 miles.

**Houston, East & West Texas.**—The preparations for changing the gage of this road between Houston and Logansport, La., from 3 ft. to standard gage have been going on for some time and are now pretty well advanced. The rails for the new standard gage track have been laid for 40 miles from Shepherd, Tex., east. It is expected that the trains on the standard gage track will begin running early in August. The line is nearly 200 miles long from Houston to Logansport, La.

**Kingston, Smith Falls & Ottawa.**—The construction of this road from Kingston, Ont., continues in progress. The road is located as far as Elgin, 34 miles from Kingston, and the whole line from Rideau to Ottawa, 98 miles, is under contract, Andrew J. Drummond, 265 University street, Montreal, being the contractor.

**Lake Superior, Iowa & Gulf.**—Articles of incorporation of the company have been filed at South Sioux City, Neb. This is a local feature of the Inter-State & Gulf project, and its object is to construct a line from some point in Nebraska to Lake Superior. The articles of incorporation contain some peculiar Populist features. The company has authority to sell bonds, to which shall be attached coupons that may be taken as payment for transportation. The roadbed and all appurtenances are to pass into control of the State, as soon as the State so desires, by legal enactment, and to be forever the property of the State. All net earnings go to the State school fund. The company, composed of local Populists, expects to raise money from the farmers and business men of the section traversed by the road.

**Long Island.**—The company will connect the tracks of the two branches of the Prospect Park & Coney Island Railroad, which have a heavy summer travel, running from Ninth avenue and Twentieth street, and Fifth Avenue and Thirty-sixth street, Brooklyn, to West Brighton, with those of the branch of the Manhattan Beach Railroad running from Bay Ridge. The intended connection, which will extend from Kensington Junction to Parkville, is to be made so that travel to Manhattan Beach can be effected from the Brooklyn stations named.

The branch from Port Jefferson, N. Y., to Wading River, which was abandoned by one contractor after several weeks' work, is now being relet by the company's chief engineer, Mr. P. D. Ford, and the work will be immediately resumed. This branch is about 11 miles long from Port Jefferson, on the north shore of Long Island, to Wading River.

**Louisville & Nashville.**—For a good while past reports have been printed in local papers in South Carolina that the Atlantic Coast Line and the Louisville & Nashville were jointly making surveys for a new line between Charleston and Augusta, Ga. August Belmont, of New York, Chairman of the Board of Directors of the Louisville & Nashville, was last week asked the direct question whether his company was interested in any surveys for a railroad between these points, but declined to make any positive statement in regard to the matter. He said, however, that he was not prepared to deny the report. The Louisville & Nashville was expected to be the purchaser of the property of the South Carolina Railroad at the recent foreclosure sale, but that railroad is now controlled by Mr. Charles Parsons. The Louisville & Nashville reaches Augusta, Ga., by the Georgia Railroad, from Atlanta to Augusta, in which it owns a one-half interest. The control of the South Carolina Railroad would have given it a very good line to the Atlantic Coast. Now that it has lost that line, it seems to have taken up the idea of building an independent railroad, in connection with the Atlantic Coast Line, from Augusta to Charleston, a distance of over 130 miles.

**Middlesex Valley.**—A contract has been let to John G. Dolan for constructing an extension of the railroad from Stanley northeast to Geneva, N. Y., connecting with the Lehigh Valley at Torrey Park. The road is now in operation from Naples to Stanley, 20 miles. The extension to be built is only eight miles long, and the roadbed is already graded, being that of the old Geneva & Southwestern Railroad, which was graded 21 years ago.

**Monongahela & Allegheny.**—The company was chartered at Harrisburg, Pa., on June 16. It is proposed to construct a road, beginning on the northerly side of the Monongahela river near the City Farm station of the Baltimore & Ohio, in Pittsburg; thence southwesterly to the mouth of Nine Mile Run, and northerly up that stream to the dividing ridge between it and the waters of Negley's Run; thence, still northerly, down Negley's Run to the southerly bank of the Allegheny river. George T. Richards, of Pittsburg, Pa., a civil engineer, is President. L. H. Partridge of Pittsburg, holds over 200 shares of the stock.

**Monterey & Fresno.**—President Jones and Vice-President H. A. Greene have arrived in California after a long visit to New York, where they were engaged in concluding financial arrangements. These officers state that satisfactory arrangements were made while they were in New York, but no definite outline of what they accomplished has been given out. The road has been surveyed from Monterey, on the coast, across the mountains to Fresno, Cal., about 170 miles, and the line has been located for about 60 miles east of Monterey. It is said that a general contract for the construction of the road has been let, and that the grading will begin on July 4 next.

**Nakusp & Slocan.**—Rails had been laid for the first ten miles out from Nakusp, B. C., at the last report and have now probably reached, and the line should be up to the head of Lake Slocan. The road is expected to reach Three Forks and be ready for business by the middle of July. The line is about 38 miles long and is being built as a branch of the Canadian Pacific.

**Ottawa, Arnprior & Parry Sound.**—Mr. G. A. Mountain, of Ottawa, chief engineer, reports the work of construction as progressing, some of it as being completed two months ahead of the contracted time. Men and teams were plentiful, so that the work is being rushed through as quickly as possible. Golden Lake, Ont., 140 miles from Ottawa, is the terminal point for this season's work.

**Pennsylvania Midland.**—An important change has been made at Osterburg, the eastern terminus of the branch to Ashtola, Somerset County, which takes the line nearer to the town. This branch will cross the Allegheny Mountains at a gap near Crum post office, in Shade Township. No tunnel will be necessary. A route with a grade of 80 ft. to the mile has been adopted. About 500 men are at work grading between Cessna and Imber Cross Roads, and cars are to be running by January 1. E. A.



Tennis, of Thompsonstown, Pa., has the contract to build and equip the line, of which George B. Orlady, of Huntingdon, Pa., is President. J. Murray Africa, of Bedford, Pa., is Chief Engineer.

**Petersburg Belt.**—The contract for this six mile belt line at Petersburg, Va., to be built by the Atlantic Coast Line, has been let to Lane Brothers, of Charlottesville, Va. The road will start from a point near Swift Creek, on the Richmond & Petersburg Railroad, in Chesterfield County, and will connect with the Petersburg & Weldon Railroad half a mile south of the city of Petersburg. The road is expected to be completed by December next. The work includes an iron bridge over the Appomattox River.

**Philadelphia & Delaware County.**—The work on this local branch of the Pennsylvania at Philadelphia is now so well along that there is little chance that the formal opening will be delayed beyond July 1, the announced date. The history of the project is given at some length in a Philadelphia paper. The road extends through a beautiful and attractive country, from Fernwood, on the Baltimore Central Railroad, to Newtown Square, a distance of 10 miles. It was first projected more than 10 years ago. The original charter was for a road from Angora Station to West Chester, under the title of the Philadelphia & Chester County Railroad. Before much work had been done financial reverses came, and the road was sold to a syndicate, who organized a company under the name of the Philadelphia & Midland Railroad Co. This company selected Fernwood as the starting point, and West Chester as the other terminus, and partially graded the road. The company failed to complete the road, which finally passed into the control of the Pennsylvania Railroad. No effort to complete the road was made until a year ago, when the residents of Newtown Square and those along the route began urging its construction. Upon their agreeing to subscribe to \$100,000 of the capital stock of the company, the Pennsylvania agreed to build the road. It traverses Upper Darby, Haverford and Marple Townships, in Delaware County. The country is very broken and picturesque, and offers beautiful sites for suburban homes.

**Philadelphia & Frankford.**—The opening of this branch of the Philadelphia & Reading, which is to occur on July 1, gives interest to an account of the work, which has been very expensive, printed in a local paper. It is less than three miles long, extending from Crescentville, on the Newtown Railroad, to Main street, Frankford. It has cost over \$500,000. This heavy expense is due largely to the purchase of valuable real estate in Frankford to give the company entrance into that town. There are no grade crossings on the line, and it has been built in the most substantial manner, especially in Frankford, where masonry arches carry the tracks over the streets. The station is in the center of Frankford. The country traversed by the road, between Crescentville and Frankford, is a most attractive one, and it is expected that, with the opening of the line, it will be rapidly taken up for house building purposes.

**Port Huron & Lexington.**—The company has been organized by the election of E. H. Brennan, of Toledo, as President and Chief Engineer, and Col. William Nichols as Secretary. The route is from Port Huron, Mich., to Lexington, Mich., passing through Lakeport, Mich., the location being confined to the Lake Huron beach. The line has been surveyed and will be built as soon as local aid promised and the right of way have all been secured.

**Potrero & Bay View.**—This railroad company has filed articles of incorporation in California to build a railroad from the intersection of Post and Montgomery streets, San Francisco, to the Bay View race course, or to Hunter's Point, four miles. The capital stock is \$500,000. The Directors are Henry F. Williams, William F. Williamson, Elijah Case, J. W. Pierson, John Kirkpatrick, C. N. Felton and J. C. Birdseye.

**San Antonio & Gulf Shore.**—President William Davis, of San Antonio, who is the head and front of this scheme, says that the work recently begun at San Antonio will be continued steadily under the contract with Marcey & Co., and he expects now to increase the force upon the work, so that 20 miles of the road east of that point will be completed early in July.

**Southern Pacific.**—Work on the Louisiana Midland branch of the railroad is progressing very satisfactorily. Twenty miles of rails have been laid, leaving only five miles more to be put down. The heavy trestling and draw span at Bayou Millet has delayed the last section of the road. The branch extends north of Crowley, La., for 20 miles to the new town of Eustice and was graded last year. The branch traverses a beautiful rolling country, adapted to the cultivation of rice and sugar. Part of it is prairie land and part is covered with forests.

E. B. Cushing, of Houston, Tex., engineer of the Southern Pacific, is surveying the proposed branch line of railroad between St. Martinsville and Port Barry, La., via Breaux Bridge, Arnaudville and Leonville, La.

**South Jersey.**—The Cape May line of this road, which, during its construction has kept the road prominent, is to be opened for traffic on June 23. The Philadelphia Record takes occasion to give a brief history of the enterprise. The branch to Cape May was formerly known as the Tuckahoe & Cape May Railroad, and has undergone many difficulties, legal and otherwise. About a year ago a party of Philadelphia capitalists, largely interested in Cape May property, and headed by Thomas Robb, Logan M. Bullitt and others, purchased the road at private sale, and organized the South Jersey Railroad. Arrangements were at once made to open the line from Winslow Junction on the Philadelphia & Reading to Sea Isle City, and this was done a month later. About four months ago the company purchased from the receiver, Robert P. Wilson, the Tuckahoe & Cape May Railroad from Tuckahoe, where connection is made with the main line of the road to Sea Isle City, to Cape May, a distance of 27 miles. The work of completing the road was at once begun, and, after numerous complications, it is now practically finished. The distance from Philadelphia to Cape May by the new line is 76 miles, and by the old route 82 miles. Among the towns reached by the South Jersey between Tuckahoe and Cape May are Woodbine, the colony established by Baron Hirsch; Dennisville, a prosperous farming centre; Cape May Court House, Green Creek, Rio Grande, Fishing Creek and other small settlements.

**South Mountain.**—There is again talk of building this thrice-abandoned Pennsylvania line. Contractors Clarke and Culp, accompanied by W. C. Mayne, an attorney, all of Philadelphia, were along the route last week. They said that the proposed road will be built, provided the owners of the land along the route will give the right of way. They claim to have arranged to secure financial assistance from a New York firm if the right of way can be secured without cost. The land owners are not inclined to give the land asked, the previous efforts to build the

road having been so unsuccessful that they doubt the sincerity of the present attempt to revive the project.

**Swift River.**—Messrs. Edw. Plummer, Hugh J. Chisholm, of Portland, Me., and Galen C. Moses have had two surveys made for a branch road to connect with the Portland & Rumford Falls Railroad, to be operated by the gentlemen above named, who are interested in the undeveloped lumber regions of Northern Maine. The estimated cost is about \$140,000.

**Tionesta Valley.**—An extension from Sheffield, the present northern terminus, to Warren, a distance of about 15 miles, is contemplated. The Philadelphia & Erie now has a line between the above-named points. This road runs from Sheffield to Sheffield Junction, where connection is made with the Pittsburg & Western.

**Washington & Chesapeake Beach.**—Coffin, Sullivan & Co., of New York city, the contractors for this railroad who recently made application for the appointment of a Receiver for the property, have made an amicable settlement of their claims. The hearing of the suit was to have been held at Baltimore on June 13, but was postponed, and it is now announced that the application will be withdrawn. Coffin, Sullivan & Co. were the general contractors for the construction and equipment of the railroad, and had been working on the railroad since January. During the last few months they had a large force on the work and were under heavy expense in carrying on their operations. The company owed them over \$100,000, and as they could not secure the payment of any part of this sum, and to prevent any action by others which would be inimical to their own creditors, they had their attorney, W. J. Taylor, of Baltimore, bring the suit for a receiver. Mr. Taylor was also appointed receiver of the contracting firm on the application of one of the partners. The railroad is to extend from a point near Washington east to Chesapeake Beach, about 30 miles, where the company has a valuable tract of land which it proposed to develop as a summer resort, building hotels and cottages and making other improvements necessary to make such a place successful. Captain A. H. Mattox, of Washington, is manager. The company expects to have the construction work under way again very soon, and the contractors also believe that the railroad will be completed during the fall.

**Willow Creek.**—This railroad company has been incorporated in Colorado by S. S. Gill, W. J. Fine and John Latimer to operate in Gunnison Country in that State.

**Wiscasset & Quebec.**—A formal beginning of the construction work on this railroad, which is to extend through the interior of Maine, was made at Wiscasset, on the coast, last week. The projectors state that sufficient funds have been raised, in addition to the bonuses granted by the towns along the road, to complete the line, as projected, to Burnham and Hartland, Me., about 50 miles north of Wiscasset. George H. Crosby, of Albion, Me., the President of the company, who has been the moving spirit in the enterprise, is now seriously ill, and it was thought that his illness would affect the success of the enterprise, but the other directors of the company state that the financial matters have been so definitely arranged that the work will go on. Rowe & Hall have the contract for the entire road.

#### GENERAL RAILROAD NEWS.

**Baltimore & Lehigh.**—The Maryland division of the road was sold, under direction of the United States Circuit Court, at Baltimore, Md., on June 16. The portion sold was what was formerly known as the Maryland Central Road, extending from Baltimore to Delta, York County, Pa. Its length is 44 miles. The road was purchased by Mr. J. Willson Brown for the first mortgage bondholders for \$250,000. The sale was under a foreclosure of the first mortgage for \$850,000. A committee of bondholders is preparing a reorganization. This committee has now deposited with it \$89,000 of the total issue of \$850,000 of bonds. The line has been in the hands of W. H. Bosley, as receiver, the last two years. The entire road extends from Baltimore to York, Pa., by a consolidation with the York & Peach Bottom Road, with connection at Delta. The Pennsylvania division of the road is in the hands of Receiver Winfield J. Taylor. A foreclosure of this part of the road has not yet been effected. No active steps will be taken toward a reorganization of the Maryland section until the Pennsylvania part is sold.

**Baltimore & Ohio.**—The company has sold to New York and London bankers \$8,750,000 4½ per cent. first mortgage terminal 40-year bonds. These bonds are secured by certain terminal properties of the railroad company in Philadelphia, Baltimore, Pittsburg, Washington and elsewhere on the main line. Among the properties included in the mortgage are the Baltimore & Ohio Central Building, in Baltimore; the Brunswick yard and railroad property, at Brunswick, Frederick County, Md.; the yards and property at Benwood, W. Va., on the Ohio river, and the terminal properties of the company at Washington, Pittsburg and Philadelphia. The money from the loan will be used to reimburse the company for advances made in acquiring the terminal properties and in their betterment. Part of it will also be spent on proposed improvements and extensions, some of which have been begun, but were suspended during the recent business depression.

**Cape Fear & Yadkin Valley.**—The Bondholders' Committee, which was appointed in April after the appointment of a Receiver, to undertake the reorganization of this company, reports that the majority of the bonds have been deposited with the Mercantile Trust Company, of Baltimore. The total issue amounts to \$3,054,000, and the committee reports that \$2,490,000 of the bonds have been deposited. The plan for the reorganization will probably not be announced for some months yet. The hearing on the petition for the removal of General John Gill, of Baltimore, as Receiver of the property, was to be heard at Charlotte, N. C., on June 14, but the hearing was postponed until June 19, and no decision has been announced.

**Charlotte, Columbia & Augusta.**—The Maryland Trust Co., of Baltimore, has organized a syndicate of capitalists for the extension of the \$2,000,000 seven per cent. first mortgage bonds of the railroad. The plan is to retire the 7 per cent. bonds and to give in exchange 5 per cent. bonds, to mature on January 1, 1910. The controlling interest in the railroad is held by the Richmond & West Point Terminal Co. It is advertised by the Richmond Terminal receivers to be sold on July 10. It extends from Charlotte, N. C., to Augusta, Ga., a distance of 191 miles, and operates 181 miles of leased roads, making a total of 372 miles. In addition to the first mortgage of \$2,000,000 on the property, there is also a second mortgage of \$500,000, bearing 7 per cent. interest, due January 1, 1910. The road will be sold subject to these two liens.

**Chester & Lenoir.**—At the annual meeting of the stockholders the directors were authorized to issue new 5 per cent. 30-year bonds to the amount of \$400,000 in exchange for old bonds which amount to \$350,000 and bear interest at 7 per cent., provided the present bondholders consent to the exchange. The excess of the outstanding bonds (\$50,000) is to be applied to the building of the link between Newton and Hickory, N. C., the estimated cost of which is \$25,000. The remaining \$25,000 is to be devoted to purchasing additional narrow gauge locomotives and for other improvements.

**Erie & Wyoming Valley.**—The Jones Lake Railroad Co., of Wayne County, has filed in the State Department at Harrisburg, Pa., articles of merger with the Erie & Wyoming Railroad Co. The Jones Lake Road is only a junction line, 1¼ miles long, and has been leased since 1888.

**Illinois Central.**—The following table shows the income from traffic for the ten months ending April 30, 1894, compared with the same period of 1893. The earnings for May, 1892 and 1894, are also given:—

	1894.	1893.	Inc.
Miles operated . . . . .	2,888	2,888	
Gross earn. . . . .	\$17,892,257	\$16,405,278	\$1,486,979
Oper. expen. and taxes. . . .	12,255,260	11,944,409	290,851
Net earn. . . . .	\$5,636,997	\$4,458,869	\$1,178,128

The gross receipts from traffic for the month of May, 1894, are estimated at \$1,453,663; the receipts for May, 1893, were \$1,739,507; being an estimated decrease of \$285,844.

During the six months from May 1 to October 1, 1893, the earnings were greatly increased by the World's Fair at Chicago. The receipts for May, 1892, are therefore reported again as affording a fairer basis for comparison with business under normal conditions.

The gross earnings for the month of May, 1892, were \$1,458,354; the receipts for May, 1894, are estimated at \$1,453,663; being an estimated decrease of \$4,691.

**Jacksonville, Mayport & Pablo.**—The contest of the rival interests for the possession of this property has again begun before the United States Court at Jacksonville, Fla. The present litigation is to secure an order to decide which of the two receivers appointed for the property has jurisdiction. Charles S. Adams is Receiver under an order of Judge Call, and John L. Marvin is Receiver under an order from Judge Swain, and is now in possession of the railroad. The line is 22 miles long from Jacksonville.

**Kansas City & Omaha.**—Default having been made in the payment of the interest due January 1, 1894, on the first mortgage bonds, both by the Kansas City & Omaha Railroad Company and the Union Pacific, and the St. Joseph & Grand Island, guarantors, and the receivers of the Union Pacific system being about to apply to the court for instructions as to whether or not they shall continue to operate the railroad, a committee of bondholders, consisting of Frederick P. Olcott, Chairman, E. C. Benedict, Simon Wormser, and S. L. Parrish, has been formed to protect the interests of the bondholders.

**Kickapoo Valley & Northern.**—The proposed lease of this railroad to the Chicago, Milwaukee & St. Paul is likely to be carried out within a short time. Mr. C. J. Cogswell, of Norwich, Conn., who is said to be the chief stockholder in the railroad, is now in Milwaukee to complete the arrangements for the transfer to that railroad. The road is operated from Wauzeka, Wis., a station on the Chicago, Milwaukee & St. Paul, east of Prairie du Chien north to Soldier's Grove, about 30 miles. It was built in 1892.

**Lehigh & Eastern.**—The reorganization of this project has been about effected, and at a meeting at Stroudsburg, Pa., S. H. Nichols, of Philadelphia, was elected President, and Liddon Flick, of Wilkesbarre, Secretary. It was decided to fix the amount of capital stock at \$5,000,000. The amount of capital paid in is said to be \$450,000. A certificate of reorganization will shortly be filed at Harrisburg. The railroad, if ever built, will begin near Tomhickon Run, through Luzerne, Carbon, Monroe and Pike counties, terminating at Matamoras, Pa.

**New York, New Haven & Hartford.**—The directors have reduced the annual dividend from ten per cent., which has been paid for many years, to eight per cent., by declaring a quarterly dividend of two per cent. instead of the usual rate of 2½ per cent. Charles P. Clark, President of the company, in explaining the reduction, says: "Our gross earnings for the last ten months have fallen off nearly nine per cent., and have not fully justified the last three quarterly dividends paid. The Directors have drawn upon the company's surplus, hoping for an improvement in business. June 30 will close the fiscal year, and, consequently, this dividend must be charged against another year's earnings. Our Directors do not anticipate a speedy resumption of commercial activity."

**Norfolk & Western.**—The annual report just issued contains copies of resolutions adopted by the stockholders at the recent annual meeting. The directors were already authorized by the stockholders in May, 1891, to retire the outstanding common stock of the company. The new resolutions request the directors at their discretion to adopt whatever plan they deem advisable to retire the outstanding common stock to accomplish the purpose in view under the authority given in 1891. The stockholders also consent to an increase of the capital stock from time to time, as the directors may determine, by the issue of additional preferred stock not exceeding 100,000 shares, and the directors may sell the new preferred stock or exchange it for bonds or other securities as may be agreed upon.

**Oregon Pacific.**—The failure of the sixth attempt to sell the property of this railroad which was made at Corvallis, Ore., on June 7, was announced in last week's issue. The sale was to include all the property of the Oregon Pacific Railroad, and the Willamette Valley & Coast Railroad, as well as the river steamers owned by the company. The upset price was \$200,000, but no bids were offered. A new order of sale will be made at the next term of the court on July 20, and it is expected that another attempt will be made to sell the property in November.

**Pennsylvania Midland.**—At a meeting of stockholders held at Huntingdon, Pa., an agreement was effected for the consolidation of the Bedford & Somerset, the Brooks' Mills & Altoona, the Mann's Choice & Hyndman, and the Bedford & Blair County Railroad Companies, under the above name. The following are the officers: President, Hon. George B. Orlady, of Huntingdon; Secretary, S. J. Spyker, of Huntingdon; Treasurer, W. Grant Wilson, of Harrisburg; Directors, C. P. Dull, McVeytown; F. J. Kooser, Esq., Somerset; Harry Cessna, Bedford; Hon. George B. Huntington; W. I. Woodcock, Esq., Hollidaysburg; T. Gerrish, Castine, Me.; John Norwood, Paterson, N. J.; George M. Warren, Castine, Me.; Chief Engineer, J. Murray Africa, Bedford, Pa. The new road will extend from Altoona to Hyndman, Pa., where it will connect with the Baltimore & Ohio Railroad. There will



be a branch from Osterburg to the Somerset coal fields at Ashtola, and another to the valuable ore mines at Cessna and Bedford. E. A. Tennis, of Thompsonstown, Pa., has the contract to build and equip this line.

**Pennsylvania, Poughkeepsie & Boston.**—W. B. Scott and J. T. Simott, of Philadelphia, and others have formed a bondholders' committee and propose to purchase the property on the foreclosure of the first mortgage bonds. The committee proposed a cash assessment of 20 per cent. on the bonds.

**Philadelphia & Reading.**—George L. Crawford, special master in the Philadelphia & Reading Railroad receivership, has filed a report in the United States Circuit Court, at Philadelphia, recommending the dismissal of the petition of Isaac L. Rice, which was filed last December and upon which numerous hearings were held. Mr. Rice asked that the receivers be dismissed for alleged dereliction of duty, and that President McLeod be held accountable for alleged Boston & Maine and New York & New England stock transactions.

In the United States Court, at Philadelphia, Judge Dallas has overruled the objections of Isaac L. Rice to allow the railroad company to enter into a contract with the city of Philadelphia to construct a subway for the road's tracks along Pennsylvania avenue. Judge Dallas made an order permitting the road to enter into the contract. The estimated cost of the subway is \$6,000,000, half to be paid by the city and half by the railroad company.

**Richmond & Danville.**—This railroad was sold in Richmond on June 15 under foreclosure proceedings. The road was bought by C. H. Coster and A. J. Thomas, of New York, representing the Richmond Terminal Reorganization Committee, for \$2,030,000, the upset price fixed by the Court. The sale was at once confirmed by the United States Court. The Southern Railway Co., which was chartered by the Virginia Legislature last spring as the successor company to the Richmond & West Point Terminal Railway & Warehouse Co., was organized in Richmond this week, with Samuel Spencer as President. It is expected that the new company will take formal possession of the Richmond & Danville Railroad on July 1, and the first meeting of the stockholders will be held on July 5. The sale of the East Tennessee, Virginia & Georgia will occur on July 7, and that of the Charlotte, Columbia & Augusta and Columbia & Greenville on July 10.

**St. Louis, Alton & Terre Haute.**—The plan for readjusting the affairs of the company has been perfected, and is briefly outlined as follows: The preferred stock is to exercise its right of conversion into common stock share for share, and will receive its arrears of accrued dividends in cash, and in addition, as a suitable equivalent for surrender of its preferred rights, 110 per cent. par value of the four per cent. bonds of the "Big Four" road, St. Louis division. The dividend bondholders are to accept, for surrender of their bonds, 100 per cent. in said Big Four four per cent. bonds. By mutual agreement, a satisfactory equivalent, in cash or securities, may be substituted for the Big Four bonds. This will leave only two classes of securities on the road, the first mortgage of \$2,500,000, and capital stock of \$3,470,800.

**Toledo, Ann Arbor & North Michigan.**—Receiver Wellington R. Burt, of Toledo, has filed in the United States Court, at Toledo, an answer to the recent suit of President James M. Ashley, in which he claimed that the company owed him over \$400,000 for unpaid salaries and money advanced. Receiver Burt makes a general denial of all the claims in Mr. Ashley's petition.

**Union Pacific.**—The report of April earnings shows a decrease in gross of \$758,249, while the net loss is \$389,408. The Oregon Navigation system makes the poorest exhibit, showing a failure to earn expenses by \$61,284. The Union Pacific, Denver & Gulf system, by reducing expenses, shows a net increase of \$8,926, and the St. Joseph & Grand Island shows a gain in both gross and net, the net gain \$9,380. The detailed operations for April and four months follow:—

UNION PACIFIC RAILWAY.				
April.	1894.	1893.	Dec.	
Gross earn.	\$1,092,567	\$1,372,303	\$279,636	
Oper. expen.	782,900	903,665	120,765	
Net earn.	\$309,666	\$468,638	\$158,871	
Since Jan. 1.				
Gross earn.	\$4,188,797	\$5,464,709	\$1,275,912	
Net earn.	1,143,232	1,895,419	752,187	
OREGON SHORT LINE & UTAH NORTHERN.				
April.				
Gross earn.	\$442,831	\$615,128	\$172,297	
Oper. expen.	306,528	364,574	88,046	
Net earn.	\$136,303	\$250,554	\$114,251	
Since Jan. 1.				
Gross earn.	\$1,540,836	\$1,941,167	\$400,330	
Net earn.	469,223	655,695	186,471	
OREGON RAILWAY & NAVIGATION.				
April.				
Gross earn.	\$219,540	\$304,517	\$84,977	
Oper. expen.	280,824	254,146	Inc. 26,578	
Net earn. (def.)	\$61,284	\$50,271	\$111,555	
Since Jan. 1.				
Gross earn.	\$884,344	\$1,173,981	\$289,637	
Net earn. (def.)	66,019	183,834	252,854	
UNION PACIFIC, DENVER & GULF.				
April.				
Gross earn.	\$213,668	\$291,406	\$77,738	
Oper. expen.	177,625	264,290	86,664	
Net earn.	\$36,042	\$27,116	Inc. \$8,926	
Since Jan. 1.				
Gross Earn.	\$870,644	\$1,311,701	\$441,057	
Net earn.	164,499	251,289	86,790	
TOTAL UNION PACIFIC SYSTEM.				
April.				
Gross earn.	\$2,395,513	\$3,153,763	\$758,249	
Oper. expen.	1,966,959	2,335,800	368,841	
Net earn.	\$428,554	\$817,962	\$389,408	
Mileage.	8,212	8,142	69.6	
Since Jan. 1.				
Gross Earn.	\$9,246,766	\$12,389,398	\$3,142,631	
Net earn.	1,927,876	3,476,686	1,548,810	

## TRAFFIC.

### Traffic Notes.

The Pike's Peak Railroad ran the first train of the season to the summit of the mountain on June 13.

Another conference will be held this month between the Presidents of the Southern Pacific and Atchison the regarding California passenger rates.

The West Shore has begun running sleeping cars between New York and Buffalo on the trains leaving New York at 7.45 p. m., and Buffalo at 4.05 p. m.

The Cincinnati-St. Louis and Cincinnati-Columbus-Cleveland lines have placed their passenger business in the hands of Robert Stevenson, as Commissioner, for one year.

The Canadian Pacific has made a reduction of about four hours in the time of the through passenger train between St. Paul and Montreal, which leaves the former city in the evening.

On the Putnam division of the New York Central, formerly the New York & Northern, passenger trains now leave New York for Yonkers at 1, 2, 3, 4, 5 and 5.55 a. m., returning at similar intervals. This is the first New York road to run suburban trains between midnight and morning.

The meeting of the Southern Railway & Steamship Association in New York city last week was devoid of marked results, but it is said that the railroads unanimously agreed to restore freight rates between New York and Southern cities on August 1. It does not appear whether the steamship lines joined in the agreement.

A bill has been passed by the House of Representatives, at Washington, authorizing the issue by railroad companies of interchangeable 5,000-mileage tickets, with permission to carry excess baggage thereon free or at reduced rates. This, if approved by the President, will give the drummers their long-sought-for favor. But whether the railroads will find it to their interest to accept and act upon the authority granted, is another question. If it had been really to their interest to sell interchangeable tickets and carry 300-pound trunks free, they would probably have found a way to do it without a special law.

The Nebraska maximum freight rate case is being argued at Omaha, before Justice Brewer and Judge Dundy, sitting in the Federal Court. The case grows out of the attempted enforcement of the Newberry bill, which was approved April 12, 1893. The railroads secured an injunction against the State Board of Railroad Commissioners, and are now attempting to void the law as unconstitutional. Charges are made that the bill was illegally enacted, and that, if put into operation, it would require the withdrawal of all the roads from business in Nebraska. The defense set up that present rates are much higher than in any other adjacent State, and that the injunction secured by the roads, having prevented the operation of the law for a year, makes the statement of its probable effect pure conjecture on the part of the roads.

### Chicago Traffic Matters.

CHICAGO, June 20, 1894.

The May statement of east-bound tonnage, the first since the putting into operation of the arbitrator's award, affords encouragement that it will be found feasible to carry out the provisions of the agreement without friction, provided some way is found to check the diversion of traffic to the intermediate gateways between Chicago and St. Louis not now included in the agreement. It was expected that the conference between Eastern and Western lines held at New York last week would evolve some satisfactory agreement in respect to through rates and divisions which would remedy the evil, but no action was taken further than to refer the whole matter to the Commissioners of the three interested Associations to prepare some plan and submit it at the Fall meeting. It is possible that before this is accomplished the situation may become serious and action will have to be taken to stop the undue diversion through these gateways.

Central Traffic Association lines continue to protest against the continued action of the Western lines in selling ticket orders in Eastern territory, and threaten retaliatory measures. The Western lines, however, are ignoring the protests.

The Western Passenger Association has discontinued its local associations at Topeka, Hutchinson, Wichita, Carthage and Joplin, on account of the withdrawal of the Atchison from the Association.

The competitors of the Burlington charge that road with having made a rate of \$30.65 from Denver to Chicago and return for a party of school teachers, in violation of agreement. The Burlington denies the accusation.

The present state of affairs regarding the action of the Lake Erie & Western in quoting a rate of \$24.75 from Indianapolis to Denver and return, for the Republican League meeting, would be ludicrous, were it not for the possibility that the Western roads may become entangled in another disagreement over excursion rates in general. The Western Passenger Association members voted to notify the Lake Erie & Western that, unless it withdrew the rate, it would be boycotted. The Lake Erie replied by saying that by advice of its counsel it could not withdraw the rate. The Western Passenger Association asked the Atchison to co-operate with it in enforcing the threatened non-interchange of business, but the Atchison declined. Thereupon General Passenger Agent Charlton, of the Alton, indulged his propensity for letter writing by addressing and publishing a communication to the Chairman of the Association, in which, after stating that his line would require the Lake Erie & Western to pay the agreed proportions on all business it delivered to the Alton, he proceeded to score the Chairman for being unjust to the Lake Erie & Western, on the ground that that line simply met the action of the Big Four and the Vandalia in the matter. Chairman Caldwell, in reply, merely calls the attention of Mr. Charlton to the fact that he only voiced the action of the Association, and that the authorized representative of the Alton was present at all the meetings of the Association at which the subject of a discontinuance of relations with the Lake Erie & Western was considered, and gave his consent to the proposed action, regardless of the attitude of the Atchison in the matter. However, there is not likely to be any suspension of relations between the roads on account of the matter, and the Lake Erie & Western will undoubtedly find some friendly connection to accept its business. The funny part of the business is that the Alton has used the refusal of the Atchison to join the Association lines in the proposed action against the Lake Erie & Western as an excuse for itself declining to stand to its agreement. As the public record of the transaction now stands, there seems to be need of a better understanding between the various officials of the Alton, as regards the recorded position of the line in the matter.

Chairman Midgley, of the Western Freight Association, has suggested a conference of representatives of lines in the Northwest engaged in the lumber carrying trade, to determine upon some adjustment of rates from Minneapolis and points northwest of there to Chicago, as well as from Wisconsin producing points to the Illinois territory, which are threatened with disturbance through the action of the Wisconsin Central and the Great Northern in applying rates from Minneapolis and Northwestern territory to Chicago.

General Passenger Agent Lomax, of the Union Pacific, in a published interview denies that the present chaotic

state of the Denver excursion business is in any sense the fault of his road. He calls attention to the fact that his line, with its connections, the Northwestern and the Alton, makes the strongest combination on Colorado business, and argues that, therefore, it would be foolish for it to be a party to any proceedings that would have the effect of disturbing legitimate business for the sake of attempting to control a comparatively insignificant proportion of excursion business. He says: "I cannot too strongly emphasize the fact that all our interests and inclinations are in the direction of conservatism, and that in no case will we inaugurate the slightest deviation from agreed rates." It is possible, however, that some of the other lines—the Atchison, for instance—will not concede that the Union Pacific is entitled to all this credit.

Notwithstanding the belief harbored by the transcontinental roads that the Canadian Pacific would "tote fair" in helping them to maintain their immigrant clearing house agreement, that line has apparently "played them" again, having announced a large cut in all rates to Pacific Coast points. A meeting is being held this week to take action in regard to meeting the rates or disregarding them.

The Executive Committee of the Southwestern Traffic Association is in session in this city, endeavoring to work out a satisfactory plan for putting into effect the new agreement recently adopted by the Association. Subsequent to the adoption of the agreement, it was found that some of the lines parties to it had outstanding large contracts made prior to the adoption of the agreement, and the problem now confronting the Committee is how to equalize these.

The shipments of east-bound freight, not including live stock, from Chicago, by all the lines, for the week ending June 16, amounted to 45,861 tons, against 53,867 tons during the preceding week, a decrease of 8,006 tons, and against 59,670 tons for the corresponding week last year. The proportions carried by each road were:—

Roads.	W'k to June 16.		W'k to June 9.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	5,022	11.0	4,914	9.1
Wabash.....	3,973	8.7	5,124	9.5
Lake Shore & Mich. South..	6,375	13.9	7,764	14.4
Pitts., Ft. Wayne & Chicago	4,510	9.8	5,287	9.8
Pitts., Cin., Chicago & St. L.	6,237	13.6	7,046	13.0
Baltimore & Ohio.....	2,470	5.4	3,440	6.4
Chicago & Grand Trunk.....	4,014	8.7	6,033	11.2
New York, Chic. & St. Louis	5,062	11.0	5,598	10.5
Chicago & Erie.....	5,328	11.6	5,515	10.3
C. C. & St. Louis.....	2,900	6.3	3,146	5.8
Totals.....	45,861	100.0	53,867	100.0

Of the above shipments, 1,923 tons were flour, 14,515 tons grain and mill stuff, 9,015 tons cured meats, 10,438 tons dried beef, 2,394 tons butter, 1,429 tons hides and 4,739 tons lumber. The three Vanderbilt lines carried 35.9 per cent.; the two Pennsylvania lines, 23.4 per cent. Lake lines carried 52,524 tons, against 57,144 tons last week.

Other Chicago traffic news will be found on page 447.

### Interstate Commerce Commission.

The Commission has issued a memorandum in the case of the Rhode Island Egg & Butter Co., and others, against the New York Central and other roads, carrying freight between Providence and Chicago, concerning the rates on empty egg cases returned. It is held that the evidence is not sufficient to warrant a conclusion either way, the main points being as follows:

1. A shipper should not be subjected to unnecessary restrictions as to the kind of case or package he shall use.
2. A rate which may be reasonable when applied to the transportation of egg cases as a disconnected service may be unreasonable if the carriage of returned cases at favorable rates is in fact a special service, the discontinuance of which would unduly burden the business of shipping eggs to points of sale.
3. Upon complaint of unreasonable classification and rating on returned empty egg cases from Providence, R. I., to Chicago, Ill., Burlington, Ia., and other western points, held, that the evidence presented is insufficient to enable the Commission to determine the question. Held, further, that the defendants and other carriers concerned should be allowed time to consider whether shippers generally are not unduly prejudiced by the increased rating complained of and take or refrain from taking action accordingly, and if the carriers fail to take satisfactory action, that the complainants and any other interested shipper or consignee should have leave, after a specified time, to ask to have the case re-opened; and thereupon such other directions be given as will serve to bring in necessary parties defendant, by amended or supplemental complaint or otherwise, as may appear to be required.

The trouble was that the railroads, after returning empty egg cases to shippers at third class for several years, raised the rate to first class. The complainants averred that this destroyed the profit from their business. Among the arguments presented was that egg cases were charged higher (first class) than eggs in cases (second class) which are much more valuable and very fragile. It was suggested that many other roads besides those complained of ought to be taken into consideration in making a decision. The Commissioners evidently believe that the railroads ought to restore the low rate on returned cases, but find it hard to adduce logical reasons for assuming to issue an order to that effect. Doubtless the rate on the eggs, including the cost of carrying back the empty cases, is low enough already, either as compared with the rates on other freight or with the cost of carrying, so that an order to make a reduction would have no scientific basis to rest upon. At the same time, the railroads, having once made a very low rate, may drive away valuable friends if they persist in their attempt to get the rates back up to a reasonable basis.

### Cut Rates to New Orleans.

Yesterday developed an event which promises much for the future welfare of New Orleans—the reduction of freight rates from New York and other Eastern points to New Orleans. It will be remembered that recently the Eastern roads and steamship lines cut rates materially to Southern points. They failed, however, to include New Orleans in the reduction, hence there existed the anomaly of higher rates to New Orleans from New York than from that point to many other Southern points which could be reached only via this place.

The Wholesale Grocers' Association took the matter in hand, and, failing to secure the desired reduction through the usual channels, called in a body on the representatives of the Southern Pacific and Cromwell Steamship Lines, and put the facts in so clear a light that the two companies promptly announced a cut in rates which will restore the equilibrium, as far as this city is concerned. —New Orleans Picayune. The grocers give special credit for their success to Mr. W. H. Masters, of the Freight Bureau.